

The Chemical Age

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Notes and Comments

The New Tariffs

WHILE the proposed tariff arrangements will affect different trades in different ways they will have one general effect on the community at large which must not be lost sight of. They will bring a great deal of new revenue into the coffers of the National Treasury. There is accordingly a risk to be guarded against at this time of economic crisis of the Government's getting more money to spend from tariffs at the very moment of its extracting higher direct taxes than have ever before been levied in time of peace on the British citizen. There is a widespread feeling among the commercial classes that no excuse can be admitted for a failure to press on with the campaign for public economy. If tariffs, which are of the nature of indirect taxes, produce their anticipated revenue, the least that can be asked is that direct taxation should be immediately reduced to a corresponding extent. The suggestion has been made in these columns before that a useful working rule would be a shilling off the income tax for every ten per cent. of a general tariff. What the House of Commons cannot allow the Government to have is the best of both worlds. These considerations are strongly reinforced by the official announcement of a rise in the unemployment figures of 218,490 in a month. The figure is a disconcerting one, but the causes of the increase are perfectly well known to every business man. It is absurd to expect industry to flourish anew in a period of grinding taxation and of half-measures towards economy.

Down with the Assessments

STRIKING confirmation of the demand of THE CHEMICAL AGE for a drive against assessments is furnished by the Supplementary Estimates for £489,365 presented

to Parliament last Saturday. These contain what is surely the best illustration extant of the old stupidity of dog eating dog. No less than £156,975 of this supplementary budget is required for increased rates on Government property. The Government is not legally liable for local rates, but submits as a sort of act of grace to the payment of what it calls contributions. Government premises are assessed and the rates collected in the ordinary way, but as a local authority cannot send a demand to the Government, the Government makes a contribution to the local authority. But how absurd it is that the Government should on the one hand be collecting income tax from ratepayers to the tune of £156,975 in order to pay this same money over to local authorities. A false impression of the real burden of the rates is created this way, and the amount of the Supplementary Estimates also shows the vigour which has been applied to the increase of assessments. Manufacturers and traders who cannot get their funds from Supplementary Estimates have to find these increased rates out of diminishing trade.

Income Tax and the Retail Trade

A MUCH larger measure of credit than has so far been given is due to merchants and retailers for the sacrifice entailed upon them by the great income tax push now nearing its end. It is important that politicians should be made to realise the extent of this sacrifice and its effect upon trading figures. The country very properly made up its mind that a demonstration of strength and solidarity was necessary and has, in consequence, applied itself to the task of balancing the Budget in characteristically British fashion, just one more proof that our people are far better than their leaders. But in the meantime the effort of the middle class all

through November and December to save, an effort which is still to some extent continuing, has imposed great hardships upon retail traders as a class. They have indeed been hit in three distinct ways. The necessary economies made by customers have diminished sales, but also the pressure of the tax collectors upon the same customers has caused many of them to take extended credit for past sales, and we hear of many cases where last quarter's accounts have passed the usual date of settlement. Not content with this double difficulty the taxing authorities apply the same pressure to the harassed tradesman who is expected to borrow from his bank to find the funds which customers have failed to supply, to meet his own tax bills.

The story has its depressing side, but is not without a strong mixture of heroism and citizenship, and prominence needs to be given to these facts at this moment in the hope that they may have some influence upon Parliament when framing next year's taxation and expenditure. It must be understood in advance that there can be no repetition of the 1932 experience when the next assessments fall due in January, 1933.

Synthetic Processes

IN our correspondence columns this week it is suggested that the chemist should devote more attention to the utilization of new raw materials and existing waste materials rather than to the development of synthetic processes. Our correspondent reminds us of the over-production which has been brought about by synthetic processes and of the lesson to be learned from the production of synthetic ammonia and nitrates. In similar light, he regards the contemplated conversion of coal into oil on a large national scale as being a venture which should be very carefully surveyed, from seemingly unimportant angles, before we take it up seriously. Even within the last week or so a warning was given to the Oil Industries Club to the effect that developments are now taking place in the treatment of coal which would do much to make it retain its position as a fuel in the face of serious competition from natural oil or, for that matter, with synthetic oil. Under these circumstances it would serve no purpose to undertake the hydrogenation of coal, when the ultimate liquid product is less efficient than coal which has been specially treated for the purpose of removing its inherent ash content, simultaneously overcoming the disadvantages of utilization in its natural state as delivered by the mines. Our correspondent is of the opinion that the wider utilization of some of the lesser known raw materials of the world, and of agricultural wastes, would serve a better purpose than the introduction of synthetic processes for assisting the world out of its present difficulties, two of which are unemployment and over-production. There is certainly something in what he says, even though his thoughts may not be expressed in great detail.

Getting Together

ARE the chemical organisations doing all they might to explore the possibilities of closer co-operation in the promotion of the best interests of chemical science and industry? We are prompted to examine the question in the light of two provincial events arranged for the present month—the Midland Chemists' Dinner at Birmingham last Saturday and the North East Coast

Chemical and Allied Industries Dinner which is to be held at Newcastle-on-Tyne on February 26. These social gatherings are expressive of the cordial relations which exist between the different branches of chemical activity in the provinces. In many other directions there is similar evidence of a willingness and a desire to get together for mutual advantage, and the frequency of the joint meetings announced in the calendar which appears in *THE CHEMICAL AGE* from week to week is perhaps one of the most encouraging signs of a general striving after unification. The tendency, however, is usually confined to the provinces, but it is certainly an example which the parent organisations might follow to the profit of them all.

We doubt whether any other industry has such an array of organisations, all striving to promote and advance the interests of chemistry as an essential element in the national life. Each has its own particular sphere—industrial, commercial, educational, analytical, research and so on—and no one would be so rash as to suggest that any of them should sacrifice its identity in a blind step towards so-called unity. It would be equally impracticable to press for the creation of yet another organisation. There is, however, a middle course which would seem to offer possibilities, and that is to apply the degree of co-operation already practised at Birmingham, Newcastle and elsewhere to the parent bodies. We have an example in the gas industry, which, with its four or five distinct organisations, contrives to hold annually, at the British Industries Fair, a joint conference representing all sides of the industry. There are many problems in the chemical industry which would lend themselves to discussion at such a conference, and the benefits of coming together in this manner would be shared by the industry as a whole.

Books Received

- BRITISH PLASTICS YEAR BOOK, 1932. London: Plastics Press, Ltd. Pp. 365. 7s. 6d.
 THE INVESTIGATION OF ATMOSPHERIC POLLUTION. Department of Scientific and Industrial Research. Report for the year ended March, 1931. London: H.M. Stationery Office. Pp. 110. 5s. 6d.
 THE KINETICS OF HOMOGENEOUS GAS REACTIONS. By Louis S. Kassel. New York: The Chemical Catalog Co. Inc. Pp. 330. \$6.50.

The Calendar

- Feb. 16.—Hull Chemical and Engineering Society. "Condensing Plant." J. N. Waite. 7.45 p.m. Grey Street, Park Street, Hull.
 Feb. 17.—Institute of Fuel. "The Properties of Coals as controlled by their Composition." Professor George Hickling. 6 p.m. Burlington House, London.
 Feb. 18.—Chemical Society. 8 p.m. Burlington House, London.
 Feb. 18.—Institute of Chemistry (Belfast Section). "The Fading of Dyed Textiles." D. A. Derrett-Smith. 7.45 p.m. Royal Belfast Academical Institution.
 Feb. 19.—Society of Dyers and Colourists (Manchester Section). "Dyeing Faults." J. Lomax. 7 p.m. 36 George Street, Manchester.
 Feb. 19.—Society of Chemical Industry (Liverpool Section). "Anthocyanins." Professor R. Robinson. 6 p.m. University, Liverpool.
 Feb. 19.—Society of Chemical Industry (South Wales Section). "Food Poisoning." S. Dixon. 7.30 p.m. Technical College, Cardiff.
 Feb. 19.—Institute of Fuel. "The Maintenance of Uniformity in Industrial Fuels." Dr. A. C. Dunningham. 7 p.m. 17 Albert Square, Manchester.
 Feb. 19.—Institution of Chemical Engineers. Tenth Annual Corporate Meeting and Annual Dinner. "Control of Industry." W. A. S. Calder. "Thermal Insulation." Dr. E. Griffiths. Hotel Victoria, Northumberland Avenue, London.

Chemical Production and Trade in Japan

General Expansion of Manufacturing Facilities

Large chemical consumption has followed Japan's rapid evolution to world power. Home production has been hampered through lack of extensive chemical raw material resources, and Japan's dependence on foreign sources is shown in its chemical importations, valued in 1930 at nearly £20,000,000. This article is abstracted from a recent issue of "Commerce Reports," which is published by the United States Department of Commerce.

THE greatest deterrent to the development of the Japanese chemical industry has been the competition of foreign manufactured chemicals. When such products were withdrawn from the market during the world war, chemical manufacturing operations extended to new lines and prospered. After the war, however, foreign competition was renewed with vigour and post-war years have witnessed intensive efforts on the part of the industry, and the Japanese Government, through subsidy and high tariff in some instances, to maintain chemical manufacturing on a profitable and progressive basis. Post-war recession was particularly marked in the Japanese dye industry, of which some indication may be had in the decline in the number of factories from 100 during the war, to 19 in 1930. The soda-ash industry, for instance, has encountered obstacles from foreign competition and the absence of local supplies of cheap industrial salt.

Production Capacity Extended

Notwithstanding these obstacles, together with the current depression, Japan, with the vision of ultimate self-maintenance for supplies of more essential commodities, has continued to enlarge its chemical productive capacity, simultaneously with curtailed output in certain instances. Expanded facilities for nitrogen-fixation operation, some of which are already under way and others contemplated, are expected to meet completely the requirements of Japanese ammonium sulphate consumers by 1935, while total imports of this product in 1930 amounted to about 336,500 tons, and actual production was curtailed about 30 per cent.

Independence of foreign sources for supplies of soda ash has also been predicted, but the dependence of the industry on the low price of silver, enabling imports of cheap salt from China, and a Government subsidy, lend uncertainty to the situation. Production of soda ash increased from 25,500 tons in 1927, to 62,700 tons in 1929, and an estimated output of 102,700 tons in 1931, while imports declined from 87,880 tons in 1929, to 72,500 tons in 1930. The output of caustic soda in 1930 was greater than in previous years, amounting to about 33,000 tons. Bleaching-powder production was curtailed from 60,710 tons in 1929 to 44,300 tons in 1930, further reduction being anticipated in 1931. In addition, the Japanese acetic-acid manufacture has expanded to meet the requirements of its rayon industry, the chief consumer. About 20,000,000 lb. were produced in 1928. Synthetic acetic acid, the manufacture of which began in 1927, totalled about 4,000,000 lb. in 1928.

Dyestuffs

Of the 19 Japanese dye plants operating in 1930, three were producing intermediates and the remainder both dyes and intermediates. The Japanese dye output during 1930 totalled 17,152,768 lb., divided as follows: basic, 567,982; direct, 1,343,415; acid, 528,287; acid mordants, 91,642; mordant, 45,819; sulphur, 14,270,404; vat, 208,231; and oil soluble, 96,988. This output represented 79 per cent. of the domestic consumption. Aside from the above, synthetic indigo was produced to the extent of 100,000 lb. China imported over 95 per cent. of Japan's dye exports, which totalled \$406,700 in value. Imports of synthetic colours into Japan declined from 5,824,267 lb., valued at £937,500, in 1929, to 3,432,533 lb., worth £396,795, in 1930. During the first nine months of 1931, however, imports increased almost a million lb. over the corresponding period of 1931. About 45 per cent. of the dye importations came from Germany in 1930 and 22 per cent. from the United States.

Paint, Varnishes and Lacquers

Japanese paint manufacturers supply about 90 per cent. of the local requirements. A peak year was reached in 1929, when paint production totalled £1,146,000. Owing to the business depression, the output has been reduced to an estimated value for 1931 of £885,420. Production, however, has been better sustained than imports, having been reduced

by only 15 per cent., while purchases from abroad declined 50 per cent. during the first six months of 1931, or from £59,375 during 1930 to £15,208 in the first half of 1931. The United States was the source of practically the entire importations. The manufacture of nitro-cellulose lacquer in Japan has been slower to develop than has the production of other paint products, and in consequence about 70 per cent. of the nitro-cellulose lacquers consumed is imported—mostly from the United States. Nitro-cellulose lacquer imports aggregated £266,900 during 1930 and £100,100 in the first six months of 1931. In all, the purchases from abroad of pigments, paints, varnishes, lacquer, and related products totalled £1,391,040 during 1930, of which the United States furnished a value of £504,166.

Chemical Fertilisers

The problem of land fertilisation has been dominant in Japan's economic life. It has resulted in concentrated efforts towards attainment of independence of foreign sources by utilisation of hydro-electric power. Expanded consumption has been particularly marked in the field of chemical fertilisers.

The production of fertilisers in Japan increased in total value from about £17,769,375 in 1927 to £20,625,000 in 1928 and £21,959,000 in 1929. This increase was accounted for principally in the inorganic fertiliser output, the aggregate value of which gained from £7,291,600 in 1927, to £9,092,080 in 1929. In the latter group ammonium sulphate accounted for 34 per cent. in 1929, having increased from 194,000 tons in 1927 to 258,000 tons in 1929. The superphosphate output exceeded 1,000,000 tons in the latter year. Contrary to the production trend of chemical fertilisers in the above period, the output of animal fertilisers declined from about £2,187,500 to £1,979,170. The production of vegetable fertilisers, consisting mostly of bean cake, soybean, and rape seed, approached the average for the preceding five years, totalling £4,531,250. That of vegetable fertilisers in 1929 amounted to £7,000,000. Ammonium sulphate manufacture, carried on principally by synthetic processes, was estimated to have totalled 300,000 tons in 1929. It was stated unofficially that the total capacity by 1935 was expected to be 750,000 tons.

Ammonium phosphate production was begun by one plant in 1930, anticipating a large future output. Notwithstanding the expansion of manufacturing capacity, chemical fertiliser production was curtailed 30 per cent. in 1930, owing largely to competition of imported fertilisers and lowered purchasing power in consequence of low prices for farm products, particularly rice and cocoons.

Fertiliser imports comprised about 70 per cent. of Japan's total chemical importations during 1930. Such purchases had an aggregate value of £13,541,700—a considerable reduction from the 1929 figure of £18,541,700. The decline was characteristic of both chemical and organic fertilisers. The reduction in the quantity of fertilisers imported, however, was not as great as the decline in value would indicate. Imports of sodium nitrate—principally from Chile—declined from about £1,041,700 in 1929, to £330,000 in 1930. The United States furnished a value of £417,000 of ammonium sulphate, while Germany, the leading source, supplied approximately £1,770,840. The United States was the source of about 35 per cent. of the phosphate rock imported in 1930, the value of the total purchases being £1,250,000. While the quantity of bean oil cake imported increased, the value declined from £6,750,000 in 1929 to £6,010,400.

Fine Chemicals and Pharmaceuticals

Japan's well-developed drug and pharmaceutical industry supplies about 75 per cent. of the country's requirements. According to statistics furnished by the Japanese Pharmaceutical Society, the domestic output of drugs, pharmaceuticals, and fine chemicals amounted to £8,333,000 in 1929, representing an increase of 43 per cent. over the 1928 figure.

Among the leading commodities produced were petrolatum, menthol crystals, salvarsan, glandular preparations, vitamin preparations, quinine, serums, and vaccines. Notwithstanding the heavy domestic production, importations of medicines approximated £1,458,330 in 1930. The United States furnished a value of about £208,330. Being in a strategic position and familiar with the requirements of neighbouring countries, Japan is an important supplier of medicinals to China, British India, the Netherland East Indies, and the Malay Archipelago.

Camphor Production

The Japanese Government owns the principal world sources of natural camphor and controls through the Bureau of Monopoly at Tokyo and the Monopoly Bureau of the Taiwan Government General the production, distribution, and sale of that product. Taiwan (Formosa) is the principal source of the world's natural camphor supply. The total value of the 1930 exports of camphor (crude and refined) and camphor oil amounted to £501,660, as compared with £763,960 in 1929.

The production of crude camphor in Japan is estimated to have averaged during the period 1922-1930, inclusive, approximately 2,500,000 lb. annually. A peak year was reached in 1926, when the output totalled 4,746,844 lb. The production declined during the two succeeding years, but the output gained during 1929 and 1930, reaching an unofficial estimate in the latter year of about 2,800,000 lb. Production of refined camphor in Japan proper amounted to about 3,300,000 lb. in 1928, the last year for which official statistics are available; that of camphor oil during that year totalled 2,400,000 lb. Exports declined from 5,500,000 lb. in 1929 to 2,850,000 lb. in 1930.

Peppermint Oil and Pyrethrum Flowers

The supply of Japan's peppermint oil comes principally from Hokkaido and Okayama and Hiroshima prefectures. In 1929 about 550,000 lb. of menthol crystals and 591,000 lb. of peppermint oil were produced, the greater proportion being exported. The United States and Great Britain are leading markets for these products. Japan also enjoys predominance

as a supplier of pyrethrum (insect) flowers. More than 25,000 acres are under pyrethrum cultivation. About 15,000,000 lb. of pyrethrum flowers were produced during 1930. Exports in that year totalled about 9,500,000 lb., the United States taking the greater proportion.

Large scale exploitation and utilisation of seaweeds for the manufacture of agar-agar and in producing foodstuffs and food flavourings is shown in the 1929 seaweed output, which amounted to 788,000,000 lb. The species used for making agar-agar aggregated 10,472,000 lb.. The production of agar-agar during 1930 was estimated at about 1,300,000 lb.

Foreign Trade in Chemicals

Japan imported a value of £19,583,300 of chemicals during 1930, which represented a reduction of almost 27 per cent. when compared with the 1929 figure. Of the total 1930 importations, vegetable fertilisers, originating mostly in China, accounted for about one-third. Bean oil cake, the largest item, is used also as a foodstuff. Excluding this type of commodity, the United States was the second largest source of chemicals imported into Japan in 1930, having furnished a value of £2,794,800.

Fertilisers constituted the leading group of commodities imported from the United States in 1930, their aggregate value being £1,389,800. Phosphate rock was the largest item, followed by ammonium sulphate. Naval stores and paints, the next most important group supplied by the United States, totalled £504,170. Germany ranked as the leading supplier of chemicals to the Japanese market, furnishing almost £4,375,000 in 1930. The latter figure represented a reduction of about 35 per cent, as compared with 1929.

Exports of chemicals from Japan were about 20 per cent. lower than in 1929. China, Japan's leading outlet, increased its purchases slightly. On the other hand, shipments to the United States declined during 1930. Camphor, menthol, and pyrethrum flowers, the largest single items exported, were destined chiefly to the United States, the value of shipments to that country in 1930 being camphor £114,590, menthol £208,330, and pyrethrum flowers £208,330.

The Society of Public Analysts

Abstracts of Scientific Papers

FIVE papers were presented at an ordinary meeting of the Society of Public Analysts, held at the Chemical Society's Rooms, Burlington House, on February 3, Dr. J. T. Dunn, president of the Society, being in the chair.

Describing "A New Method for the Determination of Lead in Organic Substances, with Special Reference to Dyestuffs," N. L. Allport and G. H. Skrimshire explained that the organic material is destroyed by wet oxidation and the lead is removed by shaking with a chloroform solution of diphenylthiocarbazone, which combines with the lead. Finally the lead is determined colorimetrically as sulphide. The method is applicable in the presence of large amounts of iron, but bismuth interferes with the method, and special procedures are necessary when appreciable amounts of tin, aluminium, nickel or cobalt are present.

In a paper on "Some Analytical Application of Sodium Hydrosulphite," Dr. B. S. Evans described a rapid and accurate method of separating tin from various other metals the sulphides of which are soluble in alkali cyanide, and which are not precipitated as metals by sodium hydrosulphate under conditions in which tin is quantitatively precipitated, apparently as stannous sulphide.

Dissolving Lead Alloys

Dr. B. S. Evans also presented a paper on "A Rapid Method of Dissolving Lead Alloys Preparatory to the Determination of Tin and Antimony." The method is based on the fact that lead dissolves rapidly and completely in a mixture of perchloric and phosphoric acids, whilst tin and antimony form insoluble compounds, which are apparently of the nature of "metastannic" and "metantimonic" acids.

A paper on "The Phloroglucinol Method for the Determination of Mechanical Wood Pulp in Paper," was presented by Dr. H. B. Dunncliff and H. D. Suri. The phloroglucinol method of Cross and Bevan was found to be unreliable in India, and the authors have therefore studied the effect of

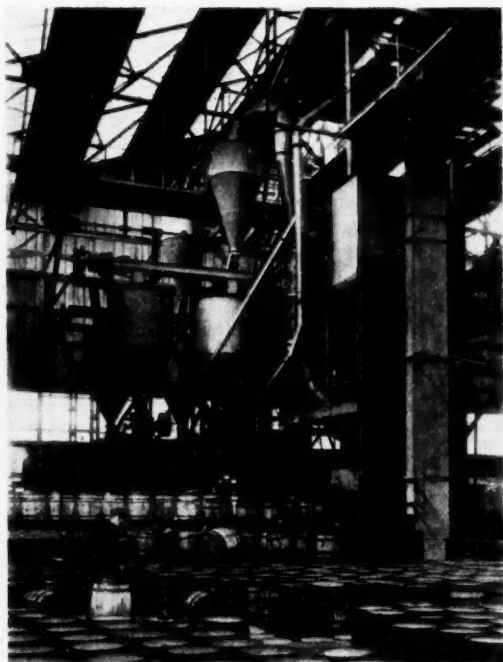
temperature on the results, the relationship between the volume of standard reagent and the weight of paper for quantitative reactions, the time required, and the mechanism of the reaction. In the procedure based on these experiments, anhydrous phloroglucinol was used, and the mixture of reagent and prepared paper is left for 18 hours at 35° C., after which the solution is cooled and filtered and a measured quantity is titrated with formaldehyde solution, as described by Cross and Bevan.

Milk Standards in Burma

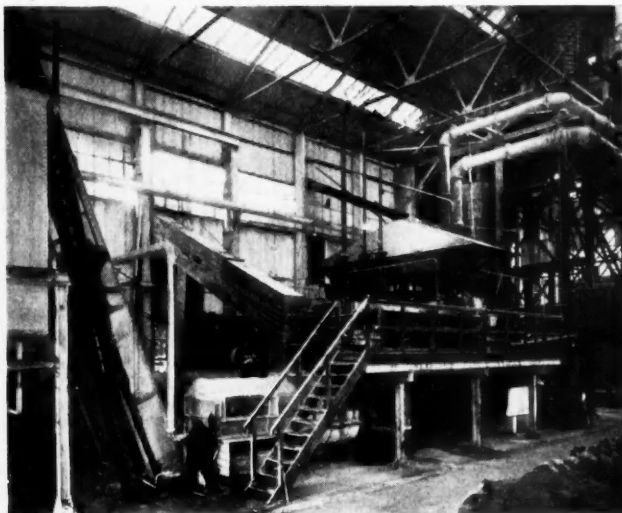
Mr. E. H. Bunce presented a paper on "Investigations Relating to Milk Standards under the Burma Food and Drugs Act." There are no legal standards for milk in Burma, but in the Government laboratory a minimum of 3 per cent. of fat and 8.5 per cent. of solids-not-fat is adopted for cow's milk, and a minimum of 5 per cent. for fat and 9.0 per cent. for solids-not-fat for buffalo's milk. The composition of milk from herds and individuals of both animals over a period of eleven months is tabulated. A common fraud is the dilution of buffalo milk with water to imitate cow's milk. This can be detected by the cryoscopic method.

Certificates were read for the first time in favour of:—Alan Arthur Douglas Comrie, B.Sc., A.I.C., Edwin William Stanley Press, B.Sc., A.I.C., and Muriel Roberts, B.Sc., F.I.C. Certificates were read for the second time in favour of Albert Green, M.C., M.Sc., Ph.D., F.I.C., John Farrar Hardwick, B.Sc., A.I.C., Ernest Stephen Hawkins, B.Sc., A.R.C.S., F.I.C., Joseph Robert Johnson, F.I.C., M.Inst.M.M., Arthur Pillans Laurie, M.A., D.Sc., F.R.S.E., and John Morgan Tucker, B.Sc., A.I.C. The following were elected members of the Society:—Thomas Whittaker Lovett and William Charles Wise, B.Sc.

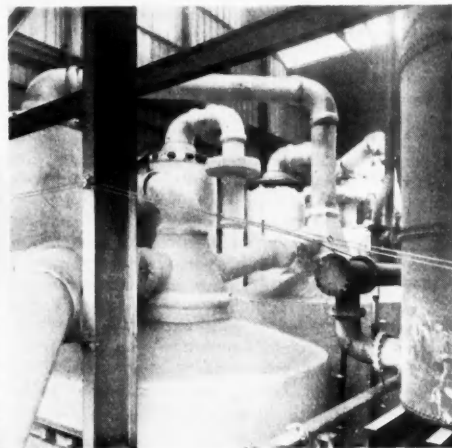
The annual general meeting of the Society will be held on March 4, at 3 p.m., instead of on March 2, and the anniversary dinner will be held at 7.30 p.m. on March 4, at the Trocadero Restaurant.



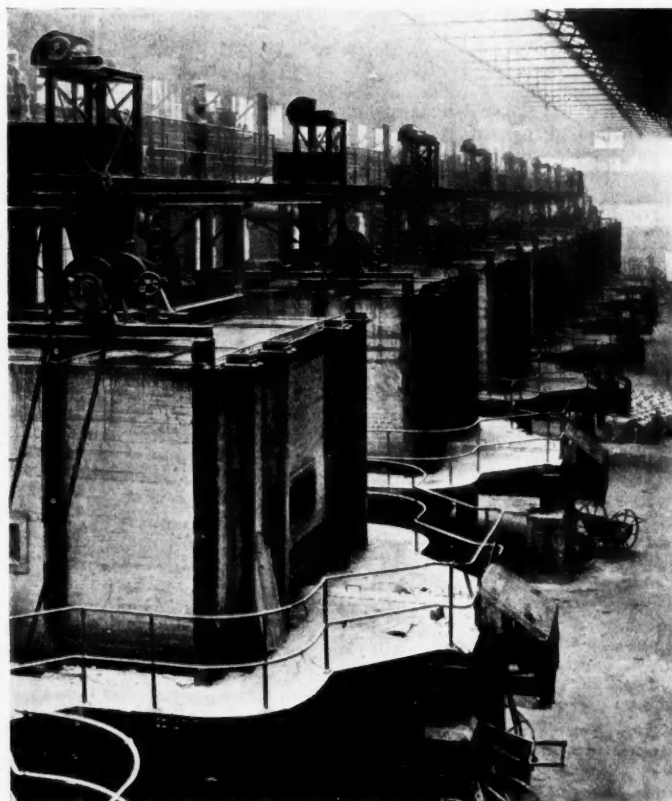
RED LEAD AND LITHARGE PACKING PLANT.



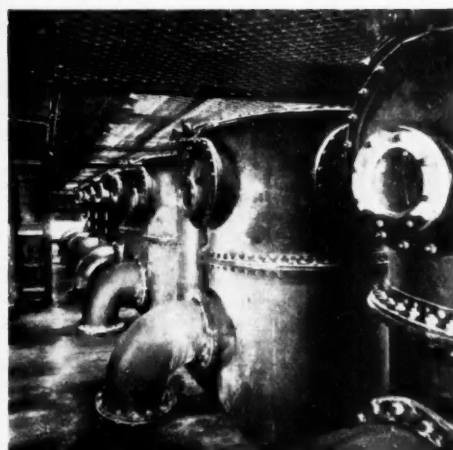
THE AMMONIUM SULPHATE PLANT.



OLEUM PLANT: TOP OF CONVERTERS.



HYDROCHLORIC ACID PLANT: SALT-CAKE FURNACES.



OLEUM PLANT: MIST TREATERS.

At the Works of Chemical and Metallurgical Corporation, Runcorn.

The Problem of Smoke Abatement

The View Points of the Small Steam User

Many excellent papers have been read on smoke abatement from the public health point of view, and much good work has been and is being done by the Royal Sanitary Institute, the National Smoke Abatement Society and others, in pointing out the damage to health and property by smoke and fumes which the Institute of Fuel and the Federation of British Industries are bringing together steam users and combustion engineers, for the purpose of making possible the smokeless factories of to-morrow. The problem is by no means an easy one according to Mr. V. R. Chadwick, A.M., Mech.E., whose paper on "Smoke Abatement" was read before a joint meeting of the Institute of Fuel and the Society of Chemical Industry, at Bristol, February 4, with the object of bringing some of the conflicting statements used in connection with smoke abatement down to the common denominator of science and with a real sense of proportion, particularly as they affect the small steam user.

THERE was, said Mr. Chadwick, an erroneous impression abroad that bulk electricity was to herald the dawn of the Golden Age, and it had been so enthusiastically boomed that the small steam user may be forgiven if he had the impression that electricity, produced in bulk, would be just about as cheap as water and solve all his smoke problems. More recently, however, he has discovered that large power stations can be prosecuted by farmers for damage to crops, and, further, that another super power station is the subject of an injunction regarding the damage likely to be caused to neighbouring buildings by sulphur fumes; and he learns with surprise that one super power station will discharge 18 tons of sulphuric acid per hour from its smokeless chimney.

Removal of Sulphur from Fumes

The question of washing fumes for the removal of sulphur is still in the early experimental stage in this country. Clarence Dock, Liverpool, and the Battersea power stations are two well known cases of which we have some information, but no definite figures have yet been given in regard to the cost of fume-washing plant. From its very nature, it is bound to be expensive, especially when it is realised that the removal of sulphur dioxide requires 17 to 22 tons of water heated to about 165° F., per ton of coal burned. We are, therefore, on the eve of very important developments in this particular phase of fume nuisance, and information is to hand on H. F. Johnstone's important researches at the University of Illinois, in which he has discovered that by using 0.025 per cent. solution of manganese salts he is able to oxidise the badly soluble sulphur dioxide (SO₂) into the easily soluble sulphur trioxide (SO₃), the manganese salts acting as a catalyst, using only 1½ tons of water per ton of coal. If these figures are anything like correct, this important discovery is bound to be of immense benefit to the "smoke abatement" question in this country, by ensuring a really innocuous chimney.

The Question of Suitable Fuel

Very often the small steam user is entirely in the hands of his fireman for all questions relating to the supply of a suitable fuel, and it is surprising how very obstinate—due to preconceived ideas—a fireman can be with regard to a particular class of fuel and method of firing. Unfortunately, however, in the case of prosecution it is the owner who has to take the blame, although his is only a moral responsibility and the cause is probably due to the rank carelessness of the fireman. Coal merchants are very well acquainted with the prejudices and preferences of many firemen for certain particular fuels, and a judicious application of a small amount of silver has been known to have a marked effect on the expressed opinion regarding the physical and chemical characteristics of a particular fuel. It may be taken roughly that 22 per cent. (37 million tons) of the fuel used in this country is used in domestic fires and 52 per cent. (88 million tons) in the boilers of industry, but the amount of destructive fumes is not in the same proportion, and, though the factory chimney has been singled out for legal attention, it is generally admitted that the ordinary domestic chimney is by far the greatest offender.

Smoke, even dense, from a boiler chimney does not necessarily represent waste; it more probably indicates efficiency; but as it is illegal to emit black smoke, the harassed engineer has to try and effect a compromise and work at a rather lower efficiency so as to keep within the law. A large London factory can be cited as an example, where, with six Lancashire boilers, 30 ft. by 8 ft., each burning approximately 10 cwt. of Scotch bituminous coal per

hour on hand-fired grates, it is possible to obtain 14 per cent. CO₂, but at this efficiency smoke is made, and they have to deliberately work round about 11 per cent. CO₂ with attendant lower efficiency so as to keep a smokeless chimney. Generations of firemen have found from practical experience that their work is easier when the chimney is smoking a little, and in many cases, where so-called "smoke consumers"—which depend for their success on dilution of the gases—have been fitted, they have been deliberately put out of action by the firemen.

Electric Power Available from the Grid

Hopes have been expressed that the Grid system might abolish a good many small steam plants. The thermal value of one unit of electricity, namely, 3,400 B.Th.U., has already been mentioned, and even with electricity at an economic productive figure—0.3d. per unit—this still leaves coal as the most economic source of heat, and, until the cost of distribution of electricity can be very greatly reduced, it will be found in the majority of small boiler plants that direct steam generation is most efficient.

The typical case may be cited of a paper mill, two high-pressure boilers (water tube) were using 50 tons of coal per week of 132 hours for power whilst two low-pressure boilers were used for heating only, and these also took 50 tons of coal per week. The engine was in a bad state of repair and it was proposed to install electricity for power. This was offered at 0.9d. per unit plus other charges, and it was estimated that the total annual cost of electricity would be in the neighbourhood of £2,500. After further consideration, it was decided to re-bore the engine cylinders, fit new pistons and repair generally at a cost of a few hundred pounds. The two high-pressure boilers were fitted with forced draught furnaces and the steam pressure increased, and the engine, instead of condensing, worked on a back pressure, exhausting into the now-discarded low-pressure boilers, from whence the steam was taken for process work. The mill then worked with 50 tons of coal per week as against the previous 100 tons, the amount of process steam being proportionately the same; as for power, the engine acting virtually as a reducing valve and the power obtained for nothing.

Oil Fuel and Gas

Oil fuel obtained a footing in this country during the great strike of 1926, when it was difficult to obtain coal. In a good many cases, such as small hotels and large office buildings, where heating only is required, it is a decided advantage, inasmuch as it can be easily worked under smokeless conditions (although it is not infallible in this respect) it can be made automatic in action, thus requiring no attention and saving labour. In cases where over 6 tons of coal per week are needed for heating, it is not an economic proposition. Six tons of good slack can be obtained for, say, £6. For the same duty, and allowing for the higher efficiency with oil, this can be produced by 3 tons 10 cwt. to 3 tons 15 cwt. of oil at a fuel cost of £13 2s. 7d. On this basis, 300 tons of coal per annum would represent an annual cost of £300, plus man's wages and extra labour clearing ash, etc., say, £150—a total of £450—against an equivalent output on oil, say, 180 tons, at a total cost of £650—leaving a difference in favour of coal of £200 as between the two systems.

Gas has been advocated, and in many cases successfully adopted, for certain metallurgical and chemical processes, and undoubtedly offers great advantages for comparatively small furnaces; but the small coal-fired furnace, which has been replaced by gas-fired furnace, is not a serious smoke offender. The really serious smoke offenders, against

which the Government in its wisdom has not yet passed any restricting laws with regard to the emission of smoke, are rolling mill furnaces, blacksmiths' forges, reheating furnaces, plate mills, etc. With regard to these we have to bow to the experience of the practical man, it being claimed by steel makers and furnacemen that unless a smoky flame is used oxidation of the blooms or billets takes place.

Until this problem has been tackled by such a body as the Fuel Research Board, rolling mills will continue to pour out black smoke. As a matter of fact, the method of firing these furnaces is such that a very high percentage CO₂ and complete absence of free oxygen is deliberately sought, and when bituminous fuel is burned under these conditions, that is, with an absence of excess air, smoke is bound to be formed. Some of the large modern steel rolling mills have adopted gas firing for large industrial furnaces, soaking pits, etc. A simple form of gas producer is built alongside the furnace or soaking pit, and the gas with sufficient pre-heated air to complete combustion passed direct into the furnace. The amount of air is very carefully regulated with instruments so as to prevent oxidation. The waste gases are passed through waste-heat boilers, and the plant is both efficient and comparatively smokeless.

Pulverised Fuels

The high hopes which were prevalent in regard to the use of pulverised fuel with Lancashire boilers are still a long way from being accomplished. There are probably six or seven different systems working on Lancashire boilers in this country, and it must be admitted that this system of firing, for Lancashire and similar type boilers, is still in the experimental stage. The chief difficulty in the system is in the amount of ash which is of necessity deposited in the flues of the boiler. When we realise that the Lancashire type boiler is designed to burn long flame coal, and no provision is made whatever for cleaning grits or dust at frequent intervals from the flues, it will be appreciated how quickly the flues can become choked when possibly one ton of flue dust daily is being deposited in them.

Pulverised fuel burning on watertube boilers, where specially designed brickwork is employed and proper provision can be made for the trapping and collection of ash, is a different matter, and in passing one might note the change which has come over the pulverised fuel burning designs recently. Just as the original Bunsen burner has been superseded by the multiple jet gas ring for general purposes, so is the multiple jet pulverised fuel burner superseding the single long flame burner requiring a combustion chamber of about 45,000 c.ft. capacity. It is to be feared, therefore, that economic results due to pulverised fuel firing have, in some cases, been optimistic and due credit has not been given to other contributory causes.

"Something Really New"

Benn's Ninepenny Novels

BENN publications are autonomous institutions held together like the British Empire. To a large extent self-governing within their domain, they each have the advantage of intimate links with a large and experienced and successful publishing organisation. THE CHEMICAL AGE is therefore only interested in a branch which deals with popular literature in so far as success in one department of this great organisation reflects upon and helps every other department. A large part of the success of THE CHEMICAL AGE is due to the fact that in addition to its own special organisation for covering the chemical industry it is an integral part of the biggest publishing concern of its kind in the world. When, therefore, Benn's make a revolution in the fiction world, THE CHEMICAL AGE does not apologise for taking some pride in the achievement. Even chemists have to give themselves an hour now and again for the relaxation of fiction. The new Ninepenny Novels open up a completely new market. They compete with nothing; they supersede nothing; they are really new. Leading popular writers have never before been published in the first instance at ninepence. Indeed, there has not been a medium for the 40,000 word story. It seems likely that the new ninepennies may do for the legitimate literature market what the *Daily Mail* did for the newspaper market thirty years ago.

Midland Chemists' Dinner

A Plea for Greater Unification

THE annual dinner organised by the joint committee of the Society of Chemical Industry, together with the Chemical Engineering group, the Institute of Chemistry and the British Association of Chemists was held on Saturday, February 6, at the Midland Hotel, Birmingham. Mr. W. A. S. Calder presided over a representative company, in which were a number of ladies. The guests included Mr. J. Davidson Pratt (Manager of the British Chemical Manufacturers' Association), Dr. E. D. Mason (Chairman of the Birmingham and Midland Section of the Society of Chemical Industry), Drs. S. R. Carter, W. Wardlaw, W. M. Hampton and Baillie, Professor R. H. Hopkins, and Messrs. H. W. Rowell, A. J. Broughall (Chemical Engineering Group), F. R. O'Shaughnessy, A. A. A. King, W. T. Collis, W. R. Barclay, A. W. Knapp, D. W. Parkes, J. R. Johnson, George King (hon. secretary of the Society of Chemical Industry), Mr. T. F. E. Rhead, Mr. J. G. Mann and Mr. W. E. Cooper.

The Value of the Chemist

MR. J. DAVIDSON PRATT, in proposing the toast of the "Midland Chemists" stated that chemists and chemistry pervaded every industrial activity, and the people of this country would have to seek the help of industrial chemists in the future. The realm of new development was the realm of chemistry, and it depended upon the British chemists to do his part. The British chemist had brains, imagination, initiative and everything that was required, except perhaps one thing—he did not think chemists had either the power or the say which they ought to have in high industrial councils. He congratulated the Midland chemists upon the excellent spirit of co-operation that existed amongst them. It was an example which, in his opinion, the parent organisation might quite well follow to the profit of them all.

MR. CALDER, in acknowledgment, warmly acknowledged the loyal support he had received as chairman of the Midland section, not only from members of the Society of Chemical Industry, but from Midland chemists generally. On behalf of the Section he presented to Mr. George King, honorary secretary, to whom they owed so much, a canteen of cutlery, on the occasion of his forthcoming marriage to Miss M. Jervis, B.Sc.

MR. A. J. BROUGHALL also presented to Mr. King a silver salver on behalf of the members of the Chemical Engineering Group of the Midland Section of the Society of Chemical Industry.

The Chemistry House Scheme

MR. KING expressed his indebtedness to the Society and the Chemical Engineering Group for this evidence of their regard and warmly thanked Mr. Calder and Mr. Broughall for their generous remarks. He was mindful, too, of the personal help which had been given to him by so many members of the Society of Chemical Industry and especially by his assistant Mr. Jones, who had rendered him yeoman service in the general secretarial work. In his capacity as hon. secretary he had had a close acquaintance with chemical organisations in various parts of the country, and he could testify to the cordial atmosphere that existed in Scotland and the North of England and to the warm relations that prevailed in Lancashire. In the Birmingham district they appeared to have struck the happy medium, and pulled well together. The joint committee was evidence of that happy relationship. He was not quite sure that such an organisation existed in London, but he was strongly of opinion that greater unification of chemical societies was necessary in London and the South of England. He hoped the Chemistry House scheme would not be allowed to fizzle out in mere talk. His own view was that if this unified movement was to come to anything the lead must come from the provinces. Councils might legislate, but they could not define a fundamental policy. His belief was that if the provincial organisations could show unity and the true spirit of co-operation to the councils at the headquarters of the several societies, some concrete proposal would soon be put forward.

MR. A. A. KING proposed a vote of thanks to Mr. Calder for presiding, to the joint committee for organising the dinner, and specially mentioned the services rendered by Mr. Collis, Mr. King and Mr. Rowell in this connection.

The Yugoslav Chemical Industry

Imports Greater than Exports in 1930

In Yugoslavia, which is primarily an agricultural country, the manufacture of chemical products is unusually well developed. This article is abstracted from a recent Report made on behalf of the United States Department of Commerce.

SINCE the war and until last year, Yugoslav exports of chemicals were greater than imports, but in 1930 the situation was reversed. Chemical products of the home industries not only supply a large proportion of the articles of general consumption; many producers in the domestic chemical industry are becoming more and more dependent upon foreign markets for prosperity. The principal Yugoslav chemical products affected by this increased dependence are caustic soda, calcium carbide, calcium cyanamide, and certain other artificial fertilisers.

During 1930 the total imports of chemicals were valued at \$4,773,000 and the exports at \$3,781,000, compared with \$5,759,000 and \$8,645,000, respectively, in 1928. The annual capacity of the four electrochemical factories in Yugoslavia approaches 100,000 metric tons, but actual production is restricted owing to the difficulty of marketing the output. The plants are located at Jajce, in Bosnia; Ruse, in Slovenia; and Dugi Rat and Sibenik, in Dalmatia. The large hydro-electric stations which supply power were erected before the war for the purpose of manufacturing calcium carbide.

Leading Industrial Chemicals

The Jajce plant produces most of the calcium carbide. The Dugi Rat and Sibenik factories convert part of their output of carbide into cyanamide. Exports of calcium carbide reached a high point in 1928—15,143 metric tons—but fell to 11,970 metric tons in 1930. The Ruse factory uses cyanamide as a raw material for the production of ammonia and carbon dioxide. Small quantities of these commodities also are imported from Austria and Hungary. Copper sulphate is obtained as a by-product of smelter and superphosphate factories producing sulphuric acid. Practically all the domestic production and considerable imported amounts are consumed annually.

In 1927 there were two important plants engaged in the distillation of hardwood—the larger located at Teslic, Bosnia, and the other at Belisco Croatia, Slavonia. In 1927 these two factories were estimated to have produced 7,500 tons of calcium acetate, 800 tons of methanol, 700 tons of acetic acid, 250 tons of formaldehyde, 820 tons of sodium acetate, and smaller quantities of miscellaneous products, including tar and pitch, acetone, methyl acetone, chloroform, creosote, and resins. A large proportion of their production is sold abroad. Although the 1928 output was greater, it is believed that owing to the general depression at home and abroad the 1930 production was smaller.

In 1928 there were 14 alcohol distilleries in existence, with a capacity of 24,754,000 litres, and 54 smaller distilleries, with a total capacity of 4,798,000 litres of pure alcohol. Exports and production have increased gradually. The increased production is due largely to the new law which permits the factories to export for each litre sold at home one litre of spirit tax free. Alcohol is exported chiefly to Italy, Greece, and the Near East.

Exports of Fertilisers

Yugoslavia has become an important exporter of fertilisers in recent years. Shipments reached their peak during 1928 when 75,578 metric tons, valued at \$2,520,000, were exported. The exports for 1929 and 1930 declined—respectively, 58,444 metric tons, valued at \$1,524,000, and 49,564 metric tons, valued at \$1,148,000. This decrease may be attributed chiefly to the world-wide depression in agricultural commodities. The principal purchasers in 1930 were Italy, Austria, Poland, Czechoslovakia, and Hungary.

Calcium cyanamide, superphosphates, and crushed bones are the chief fertilisers produced. The capacity for the production of cyanamide is stated as 100,000 metric tons and that of superphosphate, 160,000 tons. The annual consumption varies from 40,000 to 45,000 metric tons, of which 35,000 are superphosphates. The use of artificial fertilisers in Yugoslavia has been comparatively little developed. In recent

years the Government and the co-operative societies have been making strong efforts to induce farmers to increase their application of artificial fertilisers.

Essential Oils

Although there are many wild botanicals, yielding essential oils, no centralised effort has been made toward a maximum development. Rosemary, sage, laurel, and bay leaves, juniper, camomile, fennel, myrtle, elecampane, and arnica are the most prominent of these botanicals; however, only rosemary and juniper have been utilised for their essential oils. It is said that 1.5 to 1.8 kilos of oil are obtained from every 100 kilos of rosemary leaves. Soap factories and manufacturers of soft drinks, syrups, and candies are the principal consumers of essential oils in Yugoslavia. The imports of essential oils in 1930 were valued at \$170,000 and exports only \$16,000. Germany is the outstanding supplier of essential oils, but small quantities are imported from France, Austria, and Italy. There is an increasing tendency to export roots, leaves, and bark of Yugoslav essential oil plants, for distillation in neighbouring countries.

The industry catering to pharmaceutical requirements has been developing slowly around Zagreb and Karlovac. Germany, however, has been supplying Yugoslavia with quinine and quinine salts, prepared medicines, and pharmaceutical preparations, including serums and vaccines. The demand for perfumery, cosmetics, and toilet preparations is fair for a country whose population is more than 80 per cent. agricultural. Only the cities and larger towns offer a suitable field for the sale of powders, creams, rouges, and other cosmetics. These articles are supplied both by domestic producers and by imports from foreign countries. Incoming shipments are decreasing for the reason that domestic production is increasing and now supplies approximately 30 per cent. of the country's needs. Imports in 1930 were valued at \$17,000, largely from France. Small quantities came from Germany and other neighbouring countries.

Imports and Exports

Germany, Austria, Italy, and France supply most of the chemicals imported into Yugoslavia. The leading items shipped by Germany are industrial chemicals, coal-tar dyes and colours, medicinals, explosives, and paints and varnishes. Chemical imports from Austria have been declining, although in 1930 there were considerable quantities of paints and varnishes. Chemical imports from Austria have been declining although in 1930 there were considerable receipts of paints and varnishes, explosives and industrial chemicals. Industrial chemicals comprise the chief imports from Italy. The imports from France consist of naval stores, essential oils, perfumery, and toilet preparations. Just as Yugoslavia looks to continental Europe for its chemical requirements so does it look there for its market. Italy is the largest outlet and Germany, Austria, Hungary, and Czechoslovakia are the other large consumers.

The following table shows Yugoslav imports and exports of chemicals and allied products, by groups, in 1930, one dinar being equal to \$0.0177:—

	Imports. Exports.	
	(Th. dinars.)	
Industrial chemicals	93,304	100,985
Coal-tar chemicals	67,904	235
Natural dyes	1,101	237
Explosives and matches	15,625	—
Fertilizers	8,486	64,573
Glues, sizes, etc.	1,432	5,671
Gums, resins, etc.	7,224	210
Waxes	2,965	57
Paints and varnishes	39,914	302
Essential oils	9,539	1,443
Drugs and prepared medicines	7,233	39,918
Perfumery and cosmetics	9,582	4
Pyroxylin plastics	5,331	1
	269,640	213,636

News from the Industries

Mineral Oil

THE IRAK GOVERNMENT has concluded negotiations with the British Oil Development Company, represented by Admiral Lord Wester Wemyss, for the grant of a concession for the exploitation of oil in a zone west of the Tigris. According to authoritative sources, German and Italian interests are associated with the B.O.D. Company.

Pottery Trade

NO ALTERATIONS WILL BE MADE in wages in the pottery industry this year, and they will remain stabilised at the present rates for twelve months from March 25 next. This decision was arrived at on Monday, February 8, between the British Pottery Manufacturers' Federation and the National Society of Pottery Workers, who agreed that no general notices shall be exchanged this year. The arrangement concerns nearly 70,000 operatives in England and Wales. Wages in the industry were stabilised on the basis of an award given in 1924 until last year, when there was a reduction of 10 per cent., with certain exceptions. There has been unbroken peace in the industry for thirty years.

Rubber

AS A RESULT OF MOVEMENTS during the past week stocks of rubber held in the United Kingdom have been largely increased. In London an addition of 253 tons is reported, the total now amounting to 67,410 tons, while stocks held in Liverpool have been raised by 973 tons to 59,155 tons. Total holdings, therefore, have been increased by 1,226 tons to 126,565 tons. Neither the commodity nor the share market was affected by these figures, which had been more or less anticipated. It seems to be the general view that stocks have now amounted to such a huge total that even the addition of 1,226 tons cannot affect the position to any material extent. At the end of 1931 world stocks were about 655,000 tons, while the actual consumption for the whole of that year was estimated at about 672,000 tons. Despite the fact that practically every rubber producing company is at present working at a loss, it is reported that no effort will be spared to continue tapping so long as the possibility exists that some form of restriction will be introduced. Negotiations have been in progress for some months, but agreement appears to be exceedingly difficult to reach.

Tanning

IN RECENT YEARS wattle bark from East Africa has become increasingly important as an alternative source of supply to South African bark. Statistics which have recently become available show that at the beginning of the present year the total area in East Africa under wattle amounted to 33,000 acres. Two-thirds of this acreage has been planted during the past six years, and it would appear, therefore, that there are reasonable prospects of a steady supply of bark becoming available from East Africa in the future. Tanners who have used East African bark in the past have found that the quality is inclined to be variable, and that while one shipment compared very favourably with South African bark, the next shipment might be of a decidedly inferior quality. In an effort to improve the standard of the shipments of bark from East Africa, the Government has therefore issued an ordinance providing for the control of the trade. This ordinance prohibits the storage or sale of bark which is mouldy or damp, and empowers inspectors to enter any premises in which bark is stored for the purpose of examining it to see that the provisions of the ordinance have been complied with.

Lacquers

THE APPLICATION OF COPPER BRONZES in the form of a lacquer for the finishing of articles suffers from the disadvantage that the addition of copper bronze powder to nitrocellulose solutions causes the latter to set to a jelly. The practice has therefore arisen for supplying the bronze powder and the liquid vehicle in separate containers and mixing them immediately before use. In this case there is still the disadvantage that any of the mixing which is left over cannot be kept, and means for preventing or delaying this setting of the lacquer is therefore to be welcomed. A notable advance in this direction has been made recently by Bogin, Kelly and

Maroney, of the Commercial Solvents Corporation, Terre Haute, Indiana (*Ind. Eng. Chem.*, 1931, 23, 982) who have found that the gelatinisation of nitrocellulose lacquers containing copper bronze powder is greatly retarded by the addition of 0.25 to 1.0 per cent. of boric, citric, malic, tartaric, or lactic acid. Boric acid has the advantage of cheapness and a minimum tarnishing effect when the lacquer is ultimately applied to brass or steel surfaces. The proportion of the inhibitor used depends on the grade and concentration of the bronze powder, the purity of the nitrocellulose and on the presence of resins; the effect of the solvent is generally negligible, but large proportions of alcohol are injurious.

Soap Works By-Products

THE DISCOVERY OF NEW USES FOR GLYCERINE still constitutes a fundamental problem for glycerine producers, due to the rapidly growing output from soapworks all over the world. Progress in this direction has been attended by some remarkable and unexpected difficulties. For example, it was hoped that a large new market had been found for glycerine in the manufacture of anti-freeze mixtures for motor cars, especially in the United States. At the moment that this new territory seemed to be successfully captured, another and formidable rival made its appearance in the shape of ethylene glycol, which not only threatened the supremacy of glycerine in this particular sphere but in many other directions also. It is possible, however, that better success may attend the efforts to extend the use of glycerine in the manufacture of lacquers. Hitherto, the use of glycerine for most purposes has been somewhat handicapped owing to uncertainty as to the probable course of prices. These, however, are now more or less established in the sense, at least, that they cannot very well rise appreciably owing to the competition and salutary restraint of the ethylene glycol and other possible substitutes. There is also the possibility that if glycerine prices rose above a certain level, it would automatically become an economic proposition to develop the process, introduced some years ago, of synthesising glycerine from sugar.

Seed, Oil and Cake

IN ORDER TO BRING THE CAPITAL of the company into accord with the valuation of its investments in subsidiary companies the directors of the United Premier Oil and Cake Co., Ltd., have decided to hold an extraordinary meeting on February 19, to consider a resolution to reduce the capital from £1,500,000 to £937,500 by writing off 15s. from each of the 750,000 ordinary £1 shares. In a circular outlining this scheme, the directors state that it is estimated that the profits for the year to December 31 last—taken on the same basis as that of previous years—should be sufficient to provide in due course for the preference dividend for the year. After provision for this payment, the company should have a small credit balance on revenue account to be carried forward.

THE 21ST ANNUAL GENERAL MEETING of the Seed, Oil and Cake Trade Association of Liverpool was held on January 27. In the course of his address, Mr. Alexander Chrystal, the chairman, said that business in the seed, oil, and cake trade was satisfactory at the outset of the year, and, although prices were very low, considerable business was done in oil seeds and cakes in January and February. As the year advanced, business became more difficult, and unprecedented supplies of maize at very low figures militated against the sale of cakes, resulting in accumulation of stocks. Going off the gold standard in September caused a substantial advance in prices, followed by a sharp revival of trade, and manufacturers found an improved demand from home and foreign buyers of oils and cakes. Despite the spasmodic demand over the year, the volume of trade in oil-cakes was about normal, but the quantity of seeds and nuts crushed was in excess of the previous year. At the first meeting of the newly constituted executive committee, the following appointments were made:—President, Mr. Wm. Barnett Bibby (vice-chairman of J. Bibby and Sons, Ltd.); vice-president, Mr. Arthur James Baty (senior partner in Alfred Walford and Sons); and hon. treasurer, Mr. Edward Hy. Wharton-Davies (managing director of the Cattle Food Supply Co., Ltd.). In the annual report of the committee, it is stated that the membership of this Association at the end of the year was 179.

Letters to the Editor

The Editor welcomes expression of opinion and fact from responsible persons for publication in these columns. Signed letters are, of course, preferred, but where a desire for anonymity is indicated this will invariably be respected. From time to time letters containing useful ideas and suggestions have been received, signed with a nom-de-plume and giving no information as to their origin. Correspondence cannot be published in THE CHEMICAL AGE unless its authorship is revealed to the Editor.

Reduce the Assessments

To the Editor of THE CHEMICAL AGE.

SIR,—THE CHEMICAL AGE is to be congratulated upon taking up the question of the urgent need for the reduction of assessments, and it is to be hoped that the campaign will meet with success. The chemical industry is heavily burdened with national and local taxation, and any relief that can be obtained in the forthcoming revaluations of property will hasten that revival in trade which is already in sight. Since the last valuation, industrial undertakings have been paying millions of pounds extra in rates, despite the fact that in many instances the standard rate in the pound has been either unaltered or actually lowered.

I am interested in a number of companies which have been very badly hit, but for obvious reasons I am unable to disclose to your readers the names of the concerns. The following brief particulars, however, will serve to show how some of them have been effected:—

Company "A," in a northern town, in its report for 1930, recorded that it had been called upon to pay £4,000 extra in rates, owing to the recent formidable increase in the assessment of the works.

Company "B," in the southern counties, reported that for 1930 the amount paid to local authorities reached the figure of £4,982, the comparative figure for 1925 being £2,070.

Company "C," a small concern in the south, paid £300 extra in rates in the year ended March, 1931.

Company "D," in the Midlands, paid £13,298 in rates for 1930, an increase of £119.

In each case it must be remembered that the company was struggling against the prevailing conditions in industry, and the increased demands came at a time when it could least afford to meet them.—Yours faithfully,

SHAREHOLDER.

Too Many Synthetic Processes

To the Editor of THE CHEMICAL AGE.

SIR,—It is interesting to notice that the author of your article on "Catalysis" (THE CHEMICAL AGE, January 30, page 94) raises a question of the danger to industry from the introduction of too many synthetic processes. He points out that such developments have not been wholly encouraging, citing as one instance, that new synthetic processes were largely responsible for a recent breakdown of the solvent market, presumably in the United States. The chemist cannot keep on creating a demand for new products which are ultimately capable of being produced at a rate far in excess of that at which industry can absorb them. By doing this he is only contributing to one of the present troubles of overproduction, which results in a fall in prices and the ill-effects of stagnation in the branches of industry concerned. And then it is one of our immediate problems to find new uses for that particular product, to the detriment of some other product, thus merely shifting industrial depression to new fields instead of relieving it.

In urging the widespread adoption of new synthetic processes the chemist—and the financier who is actually backing the scheme "because there will be money in it"—is also adding, unconsciously to our unemployment roll. More synthetic processes do not necessarily mean more work and continuous work. Artificial silk has prospered to the detriment of other sections of the textile industry. Already there are too many artificial silk works, as is evidenced by the closing down of several works in their struggle for existence and not necessarily because their processes are unworkable. So, too, it may be of really large-scale plant is put down for the conversion of coal into oil by the hydrogenation process. The fabrication and erection of such plant might help to relieve unemployment in the engineering trades for the time being, and when the plant is in operation there would still be a certain amount of employment directly created, possibly

amounting to 4,000 persons. The increased employment offered to the miners, however, would not be much larger than it has hitherto been with normal industrial conditions in the country. And it is almost certain that definite unemployment would result in other directions as an indirect consequence. Oil wells would slacken pace, and there would be the absence of necessity to refine raw oil and convey it to those parts of the world where it is used as fuel. Added to this, it is most likely that the country would have yet another burden to bear from the need for Government aid in financing this scheme, to say nothing of the Budget deficiency which would have to be balanced with loss to the Exchequer of the duty now paid on imported oil.

The development of synthetic processes is, of course, justified to some extent in the case of certain commodities for the purpose of meeting unforeseen contingencies, such as may be caused by the cutting off of supplies during a state of war. There is also a certain amount of justification as a logical consequence of the struggle, among nations, for industrial independence and self support. But would it not be of greater advantage to us if the efforts of the chemist were directed in greater measure to the wider utilisation of raw materials and to the utilisation of wastes, especially agricultural wastes? At the moment there are plenty of raw materials which need investigation, and which would not only repay any extended scheme of utilisation, but would also provide far more employment than any synthetic process can hope to do. To-day, there are millions of tons of agricultural wastes? At the moment there are plenty of raw materials and hulls, all of which are made up largely of cellulose, lignins and pentosans capable of being utilised as fuels or for the production of other products. It is only in the United States that any far-reaching developments have taken place in this direction.

I may be wrong, but have we no lesson to learn from the results of the chemists' work in the synthetic production of ammonia and nitrates? If all the works erected for this purpose were operating at full capacity we could not possibly dispose of their output, and unfortunately man needs more than ammonia and nitrates to keep the world turning.—Yours faithfully,

SCEPTICAL.

The Works Chemist

To the Editor of THE CHEMICAL AGE.

SIR,—Your report of the discussion on the duties and responsibilities of the works chemist (last week's CHEMICAL AGE, page 121) is a welcome reminder that modern industry demands an increasing recognition of the vital rôle of the works chemist. The chemist as a rule, is a chronic sufferer from an inferiority complex, but he is not to be blamed entirely for the fact that many boards of directors fail to understand sufficiently the real significance of chemistry in industry. The chemist's work is of great importance to industry and now, more than ever, it is necessary that it should be freely employed.

The unscientific business man is apt to regard money spent on research work as so much waste, because the results cannot be guaranteed beforehand at so much per cent. It is true that results of research cannot be foreseen. The greatest often emerge unexpectedly and where they were least expected. But generally expenditure in this field brings its own return. In any case it is important that industrial firms whose work is closely allied with science, and especially with chemical science, should treat research as an essential part of their organisation and regard the outlay on it as an investment. Such firms as Imperial Chemical Industries, Ltd., and the General Electric Co., spend many thousands of pounds a year on research and development work. What is good for the biggest concerns is surely good, in proportion, for the smaller undertakings which are preparing for the better days that lie ahead.—Yours faithfully,

WORKS CHEMIST.

From Week to Week

THE GERMAN RESEARCH INSTITUTE for Aeronautics recently reported the testing of synthetic plastics with a view to determining their suitability for airplane construction.

THE WASHINGTON CHEMICAL CO., LTD., has opened London offices at Asbestos House, Southwark Street, S.E.1, with Mr. A. W. Hanley as manager. Telephone, Hop 1176; telegrams, "Pattprodex," Boroh, London.

MR. GORDON S. DICK, chief chemist to the South Australian Portland Cement Co., Ltd., is on his way to London to study rapid-hardening cements in England, France and Denmark, and will be away from Australia for about a year.

A MEETING OF THE CREDITORS of William Swann, lately carrying on business as a chemical manufacturer under the style of The Laurel Chemical Co., at Laurel Street, Leeds Rd., was held at Bradford, on February 8. The debtor's statement of affairs showed a deficiency of £1,362.

IT IS UNDERSTOOD that the Salt Union, Ltd., has purchased Marbury Hall, Northwich. It obtains a considerable supply of brine from the Marbury district and runs a pipe direct from there to Western Point for its vacuum process of salt manufacture.

LORD MELCHETT has gone to Montreux for six weeks for a rest. Lord Melchett, who is thirty-three, is a member of the board of management of Imperial Chemical Industries, chairman of Anglo-Properties, Ltd., Mond Staffordshire Refining Co., Ltd., the Victoria Syndicate, Ltd., and deputy-chairman of the South Staffordshire Mond Gas Co.

COMMENDATORE SALERNI, the Italian authority on low-temperature carbonisation, gave an assurance at Sheffield last week to the effect that the plant for his patent process for the low-temperature carbonisation of coal would be made in Sheffield. With regard to the question of the site for the plant, he promised to convey to Sir Eric Hambro, who is financing the scheme, representations made to him.

BRITISH BEMBERG, LTD., state that the report published recently regarding the closing of certain works in Germany and the transfer of machinery and operatives from Germany to Doncaster is incorrect. Arrangements, it is explained, have been made for the increase of production at Doncaster, and for this purpose a number of new spinning machines and other machines have been purchased from a German factory not requiring them. No German factory has been closed for this purpose, nor will the transfer of workmen from Germany be involved.

DR. ORMANDY RECENTLY GAVE A FRIENDLY WARNING to the members of the Oil Industries Club to the effect that the experiments in the reduction of ash in coal made by the Fuel Department of the Scientific and Industrial Research Board had progressed to a stage when the use of pulverised fuel promised to become more valuable commercially. It had been found that the inherent ash in the coal was in some coal-fields as low as 1 per cent., and the highest in a few areas 3 per cent. This discovery increased the utility of coal, for the inherent ash was so finely divided as to be no longer abrasive to the cylinders of engines. The means of reducing the ash content in coal cost about 1s. a ton.

THE WILLIAM H. NICHOL'S MEDAL of the New York Section of the American Chemical Society for 1932 has been awarded to Professor James Bryant Conant, chairman of the Division of Chemistry in Harvard University. This award, the second outstanding scientific honour to be won by Professor Conant this year, recognises his work in organic chemistry, particularly in the chemistry of chlorophyll. He receives the Chandler Medal of Columbia University this month, and the Nichol's Medal in March. At the Nichol's Medal ceremony Professor Conant will give an address entitled "An Introduction to the Chlorophyll Molecule." Professor Conant is a former chairman of the Organic Division of the American Chemical Society and of the North-Eastern Section of the American Chemical Society. His research has included work in reduction and oxidation, hemoglobin, free radicals, a quantitative study of organic reactions, and the chemistry of chlorophyll.

WORK IS EXPECTED TO COMMENCE at the Balloch Works of the British Silk Dyeing Co., Ltd., within three months. A foreign group is said to be interested.

THE BLACK POWDER WORKS of Imperial Chemical Industries, Ltd., at Glynneath, which have existed for many years, are shortly to be closed down, but the premises will still be used for the storage of high explosives.

THE EFFECT OF THE BRITISH DUTIES is compelling Muelhens, manufacturers of the "4711" brand of eau de Cologne, to install a factory near London. Muelhens' chemical manager is in London to superintend the equipment of the new factory.

IMPERIAL CHEMICAL INDUSTRIES, LTD. are endeavouring to find employment at their other factories for about 160 of the men who have been released as the result of closing down Sandbach Chemical Works. The remaining 90 employees will be pensioned off or will receive gratuities.

A VOTE OF CONDOLENCE with the relatives of the late Sir Alfred Yarrow was passed at a meeting of the members of the Royal Institution last week. Dr. C. D. Ellis, Professor L. C. Martin, Sir Philip Nash and Mr. H. C. Reynard were elected members.

MR. E. A. SWIFT, who until recently was managing director of the Sandoz Chemical Co., Ltd., a position he had held for twenty years, has just returned from an extensive tour of the chief South American countries, where he has been making a study of the local conditions and prospects of business.

THE ANNUAL DINNER of the London Section of the British Association of Chemists; will be held at Broad Street Station Restaurant, Broad Street Station, London, E.C.2, on Saturday, March 5. Further particulars may be obtained from the general secretary, "Empire House," 175 Piccadilly, London, W.1.

AT NORTHWICH, on February 4, Sir Harry McGowan distributed 200 awards for long service to employees of the Imperial Chemical Industries, gold medals being given for forty years' service, gold watches for thirty-five, and silver watches for twenty-five. Thousands of these awards have now been distributed since the scheme was initiated by the late Dr. Mond and Sir John Brunner.

FOLLOWING THE AGREEMENT with German producers of synthetic nitrate, a similar accord has been reached in Paris in regard to imports of American synthetic nitrates into France. The agreement provides for a smaller tonnage than that to be delivered by Germany, with conditions of sale relatively the same, but the rate of American deliveries are to be accelerated in order to satisfy agricultural requirements, which rate German deliveries do not ensure.

THE ANNUAL CHEMICAL AND ALLIED INDUSTRIES NORTH EAST COAST DINNER, arranged by the Chemical Society, Institute of Chemistry (N.E. Section), Society of Chemical Industry (Newcastle Section), Institute of Metals (N.E. Section), North of England Gas Managers' Association, Newcastle Chemical Industry Club and Coke Oven Managers' Association (Northern Section), will be held at the Royal Station Hotel, Newcastle-on-Tyne, on February 26. The special guests will be Dr. R. Seligman, president of the Institute of Metals, and Mr. J. E. Cowen. The principal toasts will be proposed by Dr. P. L. Robinson and Mr. E. M. Myers.

Obituary

MR. THOMAS ASPINALL, managing director of Thos. Aspinall Ltd., manufacturing chemists, Bolton. Aged 78

MR. WILLIAM MAXWELL, sales manager of the British Dyewood Company, Glasgow. Mr. Maxwell joined the British Dyewood Co. at its inception in 1898. Previously he was with the dyewood firm of Dawson and Co., and before that was associated with the sales side of Read, Holliday and Co.

MR. WILLIAM THOMAS HOWROYD, originally connected with the firm of Howroyd and Oldroyd, which was established at Dewsbury as producers and distributors of dyewoods and chemicals. Aged 81. Mr. Howroyd, in 1900, brought about the formation of the Calder and Mersey Extract Co., Ltd., in which venture he was joined by Mr. W. Moloney, and works for the new concern were established at Ditton, Lancs.

Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2. at 1s. each.

Abstracts of Accepted Specifications

- 357,488. SYNTHETIC RUBBER. I. G. Farbenindustrie Akt.-Ges., Frankfurt-on-Main, Germany. International Convention date, March 18, 1929.

Diolfines are polymerised by alkali metals in the presence of a limited quantity of water as water of crystallisation, e.g., by adding calcium chloride, sodium carbonate or sulphate, alum, or magnesium sulphate. The polymerisation is thereby controlled so that a desired grade of product is obtained.

- 357,501. AMMONIA OXIDATION. E. I. Du Pont de Nemours and Co., Wilmington, Del., U.S.A. International Convention date, August 21, 1929.

Ammonia is oxidised by means of a catalyst consisting of more than four thicknesses of gauze of 80 mesh, .003 inch diameter.

- 357,536. DYES. Newport Co., Carrollville, Wis., U.S.A. International Convention date, July 1, 1929.

N-dihydro-1:2:2':1'-anthraquinone azines substituted in at least one of the 3-positions by bromine, are chlorinated in an inert organic solvent under mild conditions to produce a complex addition product which is then decomposed with elimination of bromine. Details of the process are given, and also several examples.

- 357,508-9. TREATING PHOSPHATES. W. W. Triggs, London. From G. Ober and Sons, 110 East Lombard Street, Baltimore, U.S.A. Application date, April 7, 1930.

357,508. A stream of finely divided phosphatic material is caused to mix with a stream of acid in a zone at increased pressure in which the reaction takes place. The product is crystallised and dried. The apparatus is described.

357,509. Phosphatic material is treated in a closed container, preferably a horizontal rotating autoclave, with sulphuric or phosphoric acid, with or without ammonium sulphate or phosphate. Ammoniacal material and also potassium compounds may be present. The autoclave is then partly evacuated and ammonia admitted. The product is a fertiliser.

- 357,593. VAT-DYESTUFFS CONTAINING SULPHUR. A. Carpmael. From I.G. Farbenindustrie Akt.-Ges., Germany. Application date, June 15, 1930.

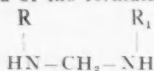
357,593. 4:6-Dichloro-3-hydroxythionaphthene, the preparation of which is described, is condensed with a reactive derivative of 4:6-dichloro-2:3-diketodihydro-thionaphthene to obtain asymmetrical 4:6-dichloro-bis-thionaphthene-indigo.

- 357,743. POLYCHLORONAPHTHALENES. Imperial Chemical Industries, Ltd., Millbank, London, F. Holt, Highlands, Weybridge Park, Weybridge, Surrey, R. Thomas, Briarcroft, Barnard Avenue, Stockton-on-Tees, and C. W. Richards, Westholme, Weston Road, Weston, near Runcorn, Cheshire. Application date, August 29, 1930.

Naphthalene is chlorinated in two stages, first at 85°-110° C. and then above 130° C., in each case in the presence of a halogen-carrying catalyst.

- 357,760. MERCAPTOBENZOTHAZOLES. Goodyear Tire and Rubber Co., 1144 East Market Street, Akron, Ohio. International Convention date, November 6, 1929.

A diamine compound of the formula



where R and R₁ are benzene groups or methyl homologues, is treated with carbon disulphide and sulphur under heat and pressure, to obtain 2-mercapto-benzothiazole and its methyl homologues.

- 357,795. ALKALINE EARTH OXIDES; BARIUM PEROXIDE. I. G. Farbenindustrie Akt.-Ges., Frankfurt-on-Main, Germany. International Convention date, October 1, 1929.

Calcium, barium, or strontium carbonate is heated with 6 per cent. of carbon in hydrogen at 800°-850° C. Barium oxide obtained in this manner is suitable for the production of peroxide by heating to 600° C. in oxygen.

- 357,798. CALCIUM HYPOCHLORITE. I. G. Farbenindustrie Akt.-Ges., Frankfurt-on-Main, Germany. Application date, October 28, 1929.

Solutions of calcium hypochlorite having a low concentration of calcium chloride are given a slight permanent alkaline reaction by adding or forming calcium hydroxide, and are then atomised in hot air to evaporate the solution to dryness. Solid calcium hypochlorite is thus obtained without appreciable loss of available chlorine.

- 357,985. ANTHRAQUINONE DERIVATIVES. A. Carpmael, London. From I. G. Farbenindustrie Akt.-Ges., Frankfurt-on-Main, Germany. Application date, June 30, 1930.

A mixture of 1:5- and 1:8-dichloro-2-methylantraquinones is obtained by treating a solution containing sulphuric acid and 2-methylantraquinone at 70°-100° C. with chlorine. The mixture is separated by treating with solvents or by fractional precipitation.

- 358,032. ANTHRAQUINONE DERIVATIVES. D. A. W. Fairweather, J. Thomas and Scottish Dyes, Ltd., Earl's Road, Grangemouth. Application date, March 25, 1930.

1-Chloranthraquinone-2-carboxylic acid is treated with pyridine-sulphur trioxide and a metal, and then with ammonia. The amidated product is treated with nitrite and acid, and coupled with phenols to obtain dyestuffs.

- 358,068. HYDROCARBONS. H. D. Elkington, London. From Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij, 30 Carel van Bylandtlaan, The Hague. Application date, April 29, 1930.

Catalysts for polymerising olefines are obtained by treating metal halides with compounds forming complexes with them, and which do not combine with the olefines according to the Friedel-Crafts reaction. Thus, nitrobenzene, nitromethane, acetone, acetophenone, benzophenone, benzoyl chloride, diphenyl sulphone, etc., may be treated with halides of aluminium, iron, tin, antimony, bismuth, etc. Examples describe the polymerisation of propylene, isobutylene, amylene and isoprene.

Specifications Accepted with Date of Application

- 305,532. Vat dyestuffs, Preparation of. Newport Chemical Corporation. October 19, 1929.

- 305,534. Non-dyeing sulphurised derivatives of phenols. Chemische Fabrik vorm. Sandoz. October 19, 1929.

- 305,595. Dyestuffs and intermediates. Imperial Chemical Industries, Ltd., W. Smith, S. Thornley, and R. F. Thomson. October 21, 1930.

- 305,600. Dyestuffs, Manufacture of. I. G. Farbenindustrie Akt.-Ges. October 19, 1929.

- 305,640. Urea- and thiourea-derivatives of the aromatic, hydroaromatic, and heterocyclic series, Process of obtaining. W. W. Groves. (I. G. Farbenindustrie Akt.-Ges.). October 23, 1930.

- 305,651. Barium hydroxide, Manufacture of. I. G. Farbenindustrie Akt.-Ges. October 25, 1930. Addition to 31567/30.

- 305,737. Obtaining ammonia as ammonium sulphate from gases, Process for. C. Still (trading as C. Still (Firm of)). December 9, 1929.

- 305,759. Stable tetrazomono-azo compounds, Preparation of. Chemische Fabrik vorm. Sandoz. January 7, 1930.

- 305,892. Hydrocarbon oils, Production of—from solid carbonaceous material by destructive hydrogenation. Standard I. G. Co. June 23, 1930.

- 305,903. Precious metals, Recovery of. J. R. Williams. April 21, 1931.

- 305,904. Sulphonated castor oil, Manufacture of. J. Riley & Sons, Ltd., W. H. Bentley and W. M. Coates. April 23, 1931.

- 305,915. Minerals, Recovery of—from ores by flotation. American Cyanamid Co. May 29, 1930.

- 305,935. Coarse grained ammonium sulphate, Production of. Hoesch-Kohn Neuessen Akt.-Ges. für Bergbau und Huttenbetrieb. June 5, 1930.

- 305,937. Azo-dyestuffs containing sulphur, Manufacture of. Soc. Anon. des Matières Colorantes et Produits Chimiques de Saint-Denis, and R. Lantz. June 19, 1930.

- 305,938. Dry sulphonated higher alcohols, Production of. H. T. Bohme Akt.-Ges. August 6, 1930.

- 305,945. Sulphuric acid, Recovery of—from the acid sludge of oil refineries. Dupont Ammonia Corporation. May 31, 1930.

- 305,964. Converting into soluble salts lead and other metals contained in lead-bearing ores. P. Gamichon. June 17, 1930.

- 305,983. Electrolytic revivification of ferrocyanide of potassium, Apparatus for. R. Brandt. December 8, 1930. Addition to 319,147.

Applications for Patents

[In the case of applications for patents under the International Convention, the priority date (that is, the original application date abroad which the applicant desires shall be accorded to the patent) is given in brackets, with the name of the country of origin. Specifications of such applications are open to inspection at the Patent Office on the anniversary of the date given in brackets, whether or not they have been accepted.]

- Alterra Akt.-Ges. Separating aluminium from silicic acid. 2289. January 25. (July 16, '31.) (Austria, July 26, '30.)
- Aluminium, Ltd. Froth-flotation processes. 2208. January 25. (United States, August 7, '31.)
- Ashcroft, E. A. Melting and purifying precipitates of tin &c. 2710. January 29.
- Production of metallic tin &c. from stannous chloride. 2711. January 29.
- Processes for extracting tin from tin-bearing materials. 2712. January 29.
- Barlow, C. H., Imperial Chemical Industries, Ltd., and Laurie, L. G. Dyeing. 3033. February 1.
- Bindley, W. T. R. Catalysts for hydrogenation &c. of hydrocarbon gases &c. 2544. January 27.
- Blagden, J. W., Clarke, G. C. H., and Howards & Sons, Ltd. Manufacture of cyclohexyl-cyclohexanol &c. 2984. February 1.
- Bozel-Maletra, Soc. Industrielle de Produits Chimiques. Manufacture of dichromates. 2540. January 27. (France, March 21, '31.)
- Briton Ferry Chemical and Manure Co., Ltd. Paint-removing composition. 2667. January 29.
- Burmal Oil Co., Ltd. Refining oil-wax mixtures. 2681. January 29.
- Carbide and Carbon Chemicals Corporation and Potts, H. E. Making reaction products of ketene &c. 2449. January 27.
- Carpmael, A. (I. G. Farbenindustrie Akt.-Ges.). Manufacture of artificial rubber-like masses. 2413. January 26. (September 30, '30.)
- Azo-dyestuffs &c. 2757. January 29.
- Manufacture of 2-alkylaminobenzene-1-carboxylic acid-4-sulphonic acids. 2867. January 30.
- Carpmael, A. (I. G. Farbenindustrie Akt.-Ges.). Dyes. 3242. February 3.
- Carter, C., and Imperial Chemical Industries, Ltd. Manufacture of alkali metal chlorates. 3398. February 4.
- Coleman, C. J. Emulsifiers. 2633. January 28.
- Dow Chemical Co. Preservation of organic substances. 2991. February 1. (United States, February 2, 1931.)
- Deutsche Gold-und Silber-Scheidanstalt vorm. Roessler. Removal of free chlorine from materials. 2366. January 26. (Germany, January 26, '31.)
- Distillers Co., Ltd., Dymock, J. B., Joshua, W. P., and Stanley, H. M. Manufacture of ethyl alcohol. 2718. January 29.
- Du Pont de Nemours & Co., E. I. Coating compositions. 2632. January 28. (United States, January 28, '31.)
- Gewerkschaft Victor. Making ammonium sulphate nitrate. 2627. January 28. (Germany, February 5, '31.)
- Houdry Process Corporation. Catalytic conversion of hydrocarbons. 2725. January 29. (United States, January 30, '31.)
- I. G. Farbenindustrie Akt.-Ges. Manufacture of aminohalogen-anthraquinone sulphonic acids. 2608. January 28. (Germany, January 29, '31.)
- Manufacture of azo dyestuffs. 2609. January 28. (Germany, February 9, '31.)
- Manufacture of vinyl substituted aromatic compounds. 2610. January 28. (Germany, January 28, '31.)
- Imperial Chemical Industries, Ltd., and Heywood, F. Refrigeration with solid carbon dioxide. 2409. January 26.
- Palmer, K. W., and Sexton, W. A. Dyeing process. 2781. January 29.
- Lodge, F., and Lumsden, C. H. Anthracene &c. dyestuffs. 2782. January 29.
- Lodge, F., and Lumsden, C. H. Mercapto compounds of anthraquinone series. 2783. January 29.
- Lodge, F., and Lumsden, C. H. Manufacture of mercaptans of anthraquinone series. 2784. January 29.
- Sexton, W. A. Dyeing process. 2785, 2786. January 29.

Arts Competition in Industrial Designs

PARTICULARS of the ninth annual open competition of industrial designs, to be held at the Imperial College of Science and Technology, Imperial Institute Road, South Kensington, London, S.W.7, in June, 1932, have now been issued, and can be obtained from the Secretary of the Royal Society of Arts, John Street, Adelphi, London, W.C.2. Intending competitors must apply to the Secretary of the Society between May 2 and May 9, for the necessary entry form, the last day for receiving entries being May 21. The designs will be received at the Imperial College of Science and Technology, Imperial Institute Road, S.W.7, between June 6 and 8. In all, scholarships and prizes amounting to about £1,400 are offered in connection with the 1932 competition.

Points from Manufacturers' Literature

The Editor welcomes copies of new brochures and leaflets describing plant, equipment and products of interest to chemical manufacturers and the chemical-using trades.

A BOOKLET SHOWING COLOURS manufactured especially for paints, enamels, printing inks, distempers, leather dressings and paper coatings, has been issued by John W. Leitch and Co., Ltd., of Milnsbridge Chemical Works, Huddersfield, who were the pioneers in the manufacture of this class of colour in this country. The upper patterns show the colours as printing inks, and the lower patterns as distempers. The chief feature about this range is its fastness to light, water, lime and oil. The colour range includes, yellow, orange, red, purple, green and blue.

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CENTRIFUGAL PUMPS constructed in acid-resisting materials are discussed in the current issue of the *Sulzer Technical Review*, which is issued by Sulzer Brothers, Ltd., 31 Bedford Square, London, W.C.1. The two materials dealt with are stainless steels of the VA group, and thermisilid, which is a silicon-iron alloy. The excellent acid resisting qualities of the VA steels are explained by their not showing any tendency to form combinations with other elements, that is, the free valencies on their outer surfaces are soon saturated with oxygen. This forms a protecting layer of oxides, and the metal consequently behaves electro-chemically in so far as it is liable to chemical action. Centrifugal pumps are being more and more used in the chemical industry for handling acids and other kinds of chemical liquids. In many cases the works are kept going day and night, and consequently, besides being resistant to chemical action, such pumps must also be of particularly robust construction, in order that they may be capable of enduring this continuous service. When designing the pumps, special attention has to be devoted to the impeller and stuffing-box, since the liquids to be handled often contain mud or other gritty particles. With an improperly designed stuffing-box there is not only a danger of scale forming in it, which would have an abrasive effect on the shaft and packing, provoking great wear in a very short time and rendering the stuffing-box very leaky, but it might also happen that the impeller would become so choked that the pump finally stopped delivering. Sulzer Brothers build their pumps in series for delivering up to 1,550 gallons per minute against heads up to 260 ft. These pumps are driven either direct-coupled by electric motors or by belt. In the latter case they prefer to fit a flexible coupling between the pump and pulley shaft, as the pump can then be changed and inspected without having to remove the drive.

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EVERYTHING REQUIRED BY THE WORKS ENGINEER is listed in a voluminous illustrated catalogue of 550 pages, which has just been issued by Bell's Asbestos and Engineering Supplies, Ltd., Bestobell Works, Slough, whose London office is at 157 Queen Victoria Street, E.C.4. The asbestos jointing, packing and insulating materials described cover nearly 70 pages. In the introductory matter which precedes this section it is emphasised that the importance of quality is more easily demonstrated in connection with asbestos jointing materials than any other class of asbestos manufactures. Apart from the extensive use of cotton, which enables short and inferior asbestos fibres to be utilised, the commonest form of "cheapening" is attained by loading with heavy and useless powders, which increase the weight and destroy the efficiency of the jointing. As these materials are invariably sold by weight, the net effect is, that even without regard to the question of efficiency, the cost per square yard of high-grade jointing is little more than that of low grade, notwithstanding the much higher cost per lb. Thus, Bell's asbestos "Rubesto" sheeting (2 ply) $\frac{1}{8}$ in. thick, weighs approximately 7 lb. per square yard, whereas a heavily loaded "cheap" quality jointing of similar appearance and thickness weighs 13 to 14 lb. per square yard. The presence of unnecessary loading in rubber-proofed jointing renders the material liable to perish before use, particularly in warm situations, or to become brittle in use, making it impossible to break and remake the joint with the same material, as is commonly done with standard qualities.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

ACID, ACETIC, 40% TECH.—£19 15s. per ton d/d address U.K. in casks.
 ACID CHROMIC.—11d. per lb., less 2½% d/d U.K.
 ACID HYDROCHLORIC.—Spot, 3s. 9d. to 6s. carboy d/d, according to purity, strength and locality.
 ACID NITRIC, 80° Tw.—Spot, £20 to £25 per ton makers' works, according to district and quality.
 ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.
 AMMONIA (ANHYDROUS).—Spot, 10d. per lb., d/d in cylinders.
 AMMONIUM BICHROMATE.—8d. per lb., d/d U.K.
 BISULPHITE OF LIME.—£7 10s. per ton, f.o.r. London, packages free.
 BLEACHING POWDER, 35/37%.—Spot, £8 15s. per ton d/d station in casks, special terms for contracts.
 BORAX, COMMERCIAL.—Granulated, £15 10s. per ton; powder, £17 per ton. (Packed in 1 cwt. bags, carriage paid any station in Great Britain. Prices quoted are for one ton lots and upwards.)
 CALCIUM CHLORIDE (SOLID), 70/75%.—Spot, £5 5s. to £5 15s. per ton d/d station in drums.
 CHROMIUM OXIDE.—10d. to 10½d. per lb. according to quantity d/d U.K.
 CHROMETAN.—Crystals, 3½d. per lb. Liquor, £19 10s. per ton d/d U.K.
 METHYLATED SPIRIT 61 O.P.—Industrial, 1s. 8d. to 2s. 3d. per gall.; pyridinised industrial, 1s. 10d. to 2s. 5d. per gall.; mineralised, 2s. 9d. to 3s. 3d. per gall. 64 O.P., 1d. extra in all cases. Prices according to quantity.
 NICKEL SULPHATE.—£38 per ton d/d.
 NICKEL AMMONIA SULPHATE.—£38 per ton d/d.
 POTASH CAUSTIC.—£30 to £33 per ton.
 POTASSIUM BICHROMATE CRYSTALS AND GRANULAR.—5d. per lb. net d/d U.K., discount according to quantity; ground 5½d. per lb.
 POTASSIUM CHLORATE.—3½d. per lb. ex-wharf, London, in cwt. kegs.
 POTASSIUM CHROMATE.—6½d. per lb. d/d U.K.
 SALAMMONIAC.—First lump, spot, £42 17s. 6d. per ton d/d address in barrels. Chloride of ammonia, £37 to £45 per ton, carr. paid.
 SALT CAKE, UNGROUND.—Spot, £3 15s. per ton d/d station in bulk.
 SODA ASH, 58%.—Spot, £6 per ton, f.o.r. in bags, special terms for contracts.
 SODA CAUSTIC, SOLID, 76/77° E.—Spot, £14 10s. per ton, d/d station.
 SODA CRYSTALS.—Spot, £5 to £5 5s. per ton, d/d station or ex depot in 2-cwt. bags.
 SODIUM ACETATE 97/98%.—£21 per ton.
 SODIUM BICARBONATE, REFINED.—Spot, £10 10s. per ton d/d station in bags.
 SODIUM BICHROMATE CRYSTALS, CAKE AND POWDER.—4d. per lb. net d/d U.K., discount according to quantity. Anhydrous 5d. per lb.
 SODIUM BISULPHITE POWDER, 60/62%.—£16 10s. per ton delivered 1-cwt. iron drums for home trade.
 SODIUM CHLORATE.—2½d. per lb.
 SODIUM CHROMATE.—3½d. per lb. d/d U.K.
 SODIUM NITRITE.—Spot, £19 to £22 per ton, d/d station in drums.
 SODIUM PHOSPHATE.—£13 to £15 per ton, f.o.r. London, casks free.
 SODIUM SILICATE, 140° Tw.—Spot, £8 5s. per ton, d/d station returnable drums.
 SODIUM SULPHATE (GLAUBER SALTS).—Spot, £4 2s. 6d. per ton, d/d.
 SODIUM SULPHIDE SOLID, 60/62%.—Spot, £10 15s. per ton, d/d in drums. Crystals—Spot, £7 15s. per ton, d/d in casks.
 SODIUM SULPHITE, PEA CRYSTALS.—Spot, £13 10s. per ton; d/d station in kegs. Commercial—Spot, £9 10s. per ton, d/d station in bags.

Coal Tar Products

ACID CARBOLIC CRYSTALS.—5½d. to 6½d. per lb. Crude 60's 1s. 4d. to 1s. 5d. per gall.
 ACID CRESYLIC 99/100.—1s. 8d. to 1s. 9d. per gall. B.P., 2s. 6d. to 3s. per gall. Refined, 2s. to 2s. 2d. per gall. Pale, 98%, 1s. 7d. to 1s. 8d. Dark, 1s. 4d. to 1s. 4½d.
 BENZOLE.—Prices at works: Crude, 7d. to 7½d. per gall.; Standard Motor, 1s. 2d. to 1s. 3d. per gall. 90%.—1s. 3d. to 1s. 4d. per gall. Pure, 1s. 6d. to 1s. 7d. per gall.
 TOLUOLE.—90%, 2s. 4d. per gall. Pure, 2s. 6d. per gall.
 XYLOL.—2s. per gall. Pure, 2s. 3d. per gall.
 CREOSOTE.—Standard specification, for export, 4½d. to 5d. net per gall. f.o.b.; for Home, 3½d. per gall. d/d.

NAPHTHA.—Solvent, 90/160, 1s. 3d. per gall. Solvent, 95/160, 1s. 5d. to 1s. 6d. per gall. Solvent, 90/190, 11d. to 1s. 2d. per gall.
 NAPHTHALENE.—Purified Crystals, £11 10s. per ton, in bags.
 PITCH.—Medium soft, 80s. to 85s. per ton, in bulk at makers' works.
 PYRIDINE.—90/140, 4s. per gall., 90/160, 4s. to 4s. 6d. per gall., 90/180, 2s. to 2s. 6d. per gall.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:—
 ACID, BENZOIC, B.P. (ex Toluol).—1s. 9½d. per lb.
 ACID, GAMMA.—Spot, 4s. per lb. 100% d/d buyer's works.
 ACID H.—Spot, 2s. 4½d. per lb. 100% d/d buyer's works.
 ACID NAPHTHONIC.—1s. 2d. per lb. 100% d/d buyer's works.
 ACID NEVILLE AND WINTHER.—Spot, 3s. per lb. 100% d/d buyer's works.
 ACID SULPHANILIC.—Spot, 8½d. per lb. 100% d/d buyer's works.
 ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.
 ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.
 BENZALDEHYDE.—Spot, 1s. 8d. per lb., packages extra, d/d buyer's works.
 BENZIDINE BASE.—Spot, 2s. 5d. per lb. 100% d/d buyer's works.
 o-CRESOL 30/31° C.—£2 6s. 5d. per cwt., in 1-ton lots.
 m-CRESOL 98/100%.—2s. 9d. per lb., in ton lots.
 p-CRESOL 34.5° C.—1s. 9d. per lb., in ton lots.
 DICHLORANILINE.—2s. 2d. per lb.
 DIMETHYLANILINE.—Spot, 1s. 6d. per lb., packages extra, d/d buyer's works.
 DINITROBENZENE.—8½d. per lb.
 DINITROTOLUENE.—48/50° C., 8d. per lb.; 66/68° C., 8½d. per lb.
 DIPHENYLAMINE.—Spot, 2s. per lb., d/d buyer's works.
 a-NAPHTHOL.—Spot, 2s. 4d. per lb., d/d buyer's works.
 B-NAPHTHOL.—Spot, £75 per ton in 1 ton lots, d/d buyer's works.
 a-NAPHTHYLAMINE.—Spot, 11½d. per lb., d/d buyer's works.
 B-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb. d/d buyer's works.
 o-NITRANILINE.—5s. 10d. per lb.
 m-NITRANILINE.—Spot, 2s. 6d. per lb. d/d buyer's works.
 p-NITRANILINE.—Spot, 1s. 8d. per lb. d/d buyer's works.
 NITROBENZENE.—Spot, 6½d. per lb.; 5-cwt. lots, drums extra, d/d buyers' works.
 NITRONAPHTHALENE.—8½d. per lb.
 SODIUM NAPHTHONATE.—Spot, 1s. 9d. per lb. 100% d/d buyer's works.
 o-TOLUIDINE.—Spot, 9½d. per lb., drums extra, d/d buyer's works.
 p-TOLUIDINE.—Spot, 1s. 9d. per lb., d/d buyer's works.
 m-XYLIDINE ACETATE.—3s. 6d. per lb., 100%.

Wood Distillation Products

ACETATE OF LIME.—Brown, £7 10s. per ton. Grey, £12 per ton. Liquor, 8d. to 9d. per gall.
 ACETIC ACID, TECHNICAL, 40%.—£16 15s. to £17 15s. per ton.
 ACETONE.—£63 to £65 per ton.
 AMYL ACETATE, TECHNICAL.—90s. to 98s. per cwt.
 CHARCOAL.—£6 10s. to £10 10s. per ton, according to grade and locality.
 IRON LIQUOR.—24°/30° Tw., 10d. to 1s. 2d. per gall.
 METHYL ACETONE, 40/50%.—£52 per ton.
 RED LIQUOR.—16° Tw., 8½d. to 10d. per gall.
 WOOD CREOSOTE.—1s. to 2s. 6d. per gall., unrefined.
 WOOD NAPHTHA, MISCIBLE.—3s. to 4s. per gall. Solvent, 3s. 9d. to 4s. 9d. per gall.
 WOOD TAR.—£2 10s. to £6 per ton.
 BROWN SUGAR OF LEAD.—£32 per ton.

Pharmaceutical and Photographic Chemicals

The following changes are reported in the markets for pharmaceutical and photographic chemicals, perfumery chemicals, and essential oils:—

CAMPHOR, REFINED FLOWERS.—3s. 7d. to 3s. 9d. per lb.
 CAMPHOR, TRANSPARENT TABLETS.—3s. 10d. to 4s. per lb.
 CAMPHOR MONOBROMIDE.—9s. 6d. per lb.
 AMIDOPYRIN.—17s. 9d. to 18s. 6d. per lb.
 TERPINE HYDRATE.—1s. 2d. to 1s. 5d. per lb.
 CITRONELLOL.—8s. 6d. per lb.
 CASSIA, 80/85 PER CENT.—4s. 9d. per lb.
 CLOVE, 90/92 PER CENT. ENGLISH.—6s. 3d. per lb.
 LEMON.—6s. 9d. per lb.

Rubber Chemicals

There are no changes to report in the market prices of rubber chemicals which were quoted in THE CHEMICAL AGE of January 16.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.

London, February 11, 1932.

MARKETS present a very strong and firm position. An active demand has been received for the majority of chemical products and especially for imported material.

General Chemicals

ACETONE.—Continues in active demand with the market firm at £65 to £68 per ton.
 ACID, ACETIC.—Is receiving a strong demand with the market firm at £37 5s. to £39 5s. per ton for Technical 80 per cent. and £38 5s. to £40 5s. per ton for Pure 80 per cent.
 ACID, CITRIC.—The demand has been of somewhat larger volume with the market firm at about 1s. 2d. per lb., less 5 per cent. Another source quotes 1s. 1d. per lb.
 ACID, FORMIC.—Continues in good demand with supplies in rather short supply for early delivery. The market is firm at £51 to £52 per ton.
 ACID, OXALIC.—Conditions here continue very active with a large amount of business passing at £50 per ton for material packed in casks and £51 10s. per ton for material in kegs.
 ACID, TARTARIC.—In slightly better demand with the market firm at about 1s. 2d. per lb. less 5 per cent.
 ALUMINA SULPHATE.—In steady demand with prices ranging from £8 15s. to £9 10s. according to quantity and quality. (Another source quotes £8 10s. per ton.)
 ARSENIC.—The demand has not been quite so active and prices continue to be firmly maintained at about £24 10s. c.i.f. main U.K. Ports for imported material.
 BARIUM CHLORIDE.—In good demand at about £11 10s. per ton.
 CREAM OF TARTAR.—Continues firm at 102s. 6d. to 105s. per cwt. with an increasing demand.
 FORMALDEHYDE.—The market continues firm at about £30 per ton with a good demand.
 LEAD ACETATE.—In rather better demand with White quoted at about £44 per ton and Brown £43 per ton. (Another source quotes £43 and £42 per ton, respectively.)
 LITHOPONE.—The position is very firm with the price quoted at about £30 per ton.

Latest Oil Prices

LONDON, February 10.—LINSEED OIL was steady. Spot, ex mill. £17 5s.; February, £15; March-April, £15 2s. 6d.; May-August, £16 2s. 6d.; September-December, £17 5s. per ton, naked. RAPE OIL was quiet. Crude extracted, £30 10s.; technical refined, £32 10s. per ton, naked, ex wharf. COTTON OIL was firm. Egyptian crude, £24; refined common edible, £27; and deodorized, £29 per ton, naked, ex mill. TURPENTINE was firm. American, spot, 51s. 9d.; March-April, 52s. 6d. per cwt.

HULL.—LINSEED OIL, spot and February, closed at £15 5s.; May-August, at £16 2s. 6d.; September-December at £17 2s. 6d., naked. COTTON OIL.—Egyptian, crude, spot, £22 10s.; edible, refined, spot, £25; technical, spot, £25; deodorized, £27, naked. PALM KERNEL OIL.—Crude, f.m.q., spot, £26, naked. GROUNDNUT OIL.—Crushed-extracted, spot, £34 10s.; deodorized, £38 10s. SOYA OIL.—Crushed-extracted, spot, £21 10s.; deodorized, £25. RAPE OIL.—Crushed-extracted, spot, £29 10s.; refined, £31 10s. per ton. COD OIL, 16s. per cwt. CASTOR OIL.—Pharmacy, spot, 45s. 6d.; firsts, 40s. 6d.; seconds, 38s. 6d. per cwt. TURPENTINE.—American, spot, 53s. 6d. per cwt.

Scottish Coal Tar Products

INQUIRIES continue numerous but, supplies of most products being scarce, there is little new business. Ordinary cresylic acid is an exception, there being plentiful supplies available.

CRESYLIC ACID.—Quotations are unchanged but for substantial quantities a discount could be obtained. Pale, 99/100 per cent., 1s. 3½d. to 1s. 4½d. per gallon; pale, 97/99 per cent., 1s. 1½d. to 1s. 2½d. per gallon; dark, 97/99 per cent., 1s. 0½d. to 1s. 1½d. per gallon; all f.o.r. makers' works. High Boiling Acid is steady at 2s. 6d. to 3s. per gallon.

CARBOLIC SIXTIES.—Production is well looked after at 1s. 7d. to 1s. 8d. per gallon ex works in buyers' packages.

CRESOTE OIL.—A fair volume of business is being transacted in the best qualities. Specification Oils, 2½d. to 3½d. per gallon; washed oil, 3½d. to 3½d. per gallon; gas works ordinary, 3½d. to 4d. per gallon; all f.o.r. naked.

COAL TAR PITCH.—The home value is firm at 75s. to 77s. 6d. per ton ex works, while export remains nominal at 70s. to 75s. per ton f.o.b. Glasgow in bulk.

BLAST FURNACE PITCH.—The increase recently noted has caused a temporary curtailment of business. Controlled prices are 50s. per

POTASH BICHROMATE.—Unchanged at 5d. per lb. for delivery up to the end of March with usual discounts for contracts.

POTASH CHLORATE.—Rather higher at about £33 to £35 per ton and in good request.

POTASH PERMANGANATE NEEDLE CRYSTALS B.P.—There is a satisfactory demand with the market firm at 8½d. per lb.

POTASH PRUSSATE.—A larger volume of business is offering with the market firm at about 8½d. per lb.

SODA ACETATE.—Is quoted rather higher at about £22 to £23 per ton with conditions very firm.

SODA BICHROMATE.—Unchanged at 4d. per lb. for delivery up to the end of March with usual discounts for contracts.

SODA CHLORATE.—In good request with the market firm at about £30 per ton. (Another source quotes £29 10s. per ton.)

SODA NITRATE.—There is a fair amount of business passing at £20 to £21 per ton. (Another source quotes £21 to £22 per ton.)

SODA PRUSSATE.—The market is firm at 5d. to 5½d. per lb. according to quantity with a good demand.

SODA SULPHIDE.—In steady request with prices unchanged.

ZINC SULPHATE.—Rather more business is being placed at £12 per ton.

Coal Tar Products

THERE is no change to report in the coal tar products market from last week, prices remaining firm.

MOTOR BENZOL.—About 1s. 4½d. to 1s. 5½d. per gallon f.o.r.

SOLVENT NAPHTHA.—Quoted at about 1s. 1½d. to 1s. 2d. per gallon f.o.r.

HEAVY NAPHTHA.—Obtainable at about 11d. to 1s. 0½d. per gallon f.o.r.

CRESOTE OIL.—About 3d. to 3½d. per gallon f.o.r. in the North, and about 4d. to 4½d. per gallon in London.

CRESYLIC ACID.—About 1s. 6d. per gallon f.o.r. for the 98/100 per cent. quality, and at about 1s. 4d. per gallon for the Dark quality 95/97 per cent.

NAPHTHALENES.—Quoted at £3 to £3 10s. per ton for the firelighter quality, at about £4 to £4 10s. per ton for the 74/76 quality, and at about £5 10s. to £6 per ton for the 76/78 quality.

PITCH.—Quoted at 75s. to 80s. per ton f.o.b. East Coast Port.

ton f.o.r. works, and 55s. per ton f.a.s. Glasgow for export.

REFINED COAL TAR.—Interest is centred on the forward position and values are steady at 4d. per gallon f.o.r. naked.

WATER WHITE PRODUCTS.—No change can be recorded. Prices are weak. Motor Benzol, 1s. 3½d. to 1s. 4½d. per gallon; 90/100 solvent, 1s. 2½d. to 1s. 3½d. per gallon; and 90/100 heavy solvent, 1s. 0½d. to 1s. 1½d. per gallon; all in bulk ex works.

South Wales By-Products

SOUTH WALES by-products activities continue to be on a restricted scale. Business in most products is erratic and there are no expectations of an early improvement. The price of pitch is moderate and confined to prompt delivery parcels. Values are unchanged. Refined tar has a slightly better call, with prices unchanged for coke oven and gasworks tar. Road tar has only a moderate demand, with quotations unchanged round about 13s. per 40-gallon barrel. Naphthas have a practically dead market. Solvents have a small sporadic call, but Heavy has hardly any demand. Cresote remains weak, but motor benzol remains a fairly good feature. Patent fuel and coke exports are unsatisfactory. Patent fuel prices are:—10s. to 10s. 3d., ex ship, Cardiff; 18s. to 18s. 3d. ex ship, Swansea. Coke prices are:—best foundry, 32s. 6d. to 36s. 6d.; good foundry, 22s. 6d. to 25s.; furnace, 17s. to 18s.

Nitrogen Fertilisers

SULPHATE OF AMMONIA.—Export.—The market continues unchanged at £5 5s. per ton f.o.b. U.K. port in single bags. There has been the usual seasonal increased demand in most consuming markets, but as supplies appear to be plentiful prices have not risen. Home.—On account of the exceptionally dry weather the demand is earlier this year, and already large tonnages of sulphate of ammonia have been delivered. Prices remain unchanged at £7 per ton delivered in 6-ton lots to consumers' nearest stations.

IMPORTED NITRATE OF SODA.—Few movements have been reported. Stocks in this country are sufficient for a year's requirements. Prices remain unchanged at £8 16s. per ton for February/June delivery in 6-ton lots to consumers' nearest stations.

BRITISH NITRATE OF SODA.—Price continues unchanged at the same figure as for the imported product.

NITRO-CHALK.—Prices remain unchanged. Supplies are available at certain South Coast Ports, and over the next few months a brisk business is anticipated.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE by Messrs. Chas. Tennant and Co., Ltd., Glasgow, and may be accepted as representing this firm's independent and impartial opinions.

Glasgow, February 10, 1932.

CONTINUED activity is reported in the Scottish heavy chemical market. Prices are still unsettled on account of the exchange rates and proposed tariffs.

ACETONE.—Quoted £66 to £68 per ton ex wharf, according to quantity.

ACID, ACETIC.—Prices ruling are as follows: glacial, 98/100%, £48 to £59 per ton; pure, 80%, £38 5s. per ton; technical, 80%, £37 5s. delivered buyer's premises Great Britain.

ACID, BORIC.—Granulated commercial, £26 10s. per ton; B.P. crystals, £35 10s. per ton; B.P. powder, £36 10s. per ton, in 1-cwt. bags, delivered Great Britain free in one-ton lots upwards.

ACID, HYDROCHLORIC.—Usual steady demand. Arsenical quality, 4s. per carboy. Dearsenicated quality, 5s. per carboy, ex works, full wagon loads.

ACID, NITRIC, 80° QUALITY.—£23 per ton, ex station, full truck loads.

ACID, OXALIC.—98/100%.—On offer at £50 to £53 per ton, ex store.

ACID, SULPHURIC.—£3 12s. 6d. per ton, ex works, for 144° quality. £7 per ton for 168°. Dearsenicated quality, 20s. per ton extra.

ACID, TARTARIC, B.P. CRYSTALS.—Quoted 1s. 1½d. to 1s. 1½d. per lb., less 5%, carriage paid.

ALUMINA SULPHATE.—Quoted £8 to £8 10s. per ton, ex store.

ALUM, LUMP POTASH.—Now quoted at £9 per ton, ex store.

AMMONIA ANHYDROUS.—Quoted 10d. to 1s. per lb., containers extra and returnable.

AMMONIA CARBONATE.—Lump quality quoted £36 per ton. Powdered, £38 per ton, packed in 5 cwt. casks, delivered U.K. stations or f.o.b. U.K. ports.

AMMONIA LIQUID, 80°.—Unchanged at about 2½d. to 3d. per lb., delivered, according to quantity.

AMMONIA MURIATE.—British dog tooth crystals quoted round £32 to £35 per ton, carriage paid according to quantity.

ANTIMONY OXIDE.—Spot material quoted at about £29 per ton, c.i.f. U.K. ports.

ARSENIC, WHITE POWDERED.—Quoted £27 per ton, ex wharf. Spot material still on offer at £28 10s. per ton, ex store.

BARIUM CHLORIDE.—Price about £11 5s. per ton in casks, ex store.

BLEACHING POWDER.—British manufacturers' contract price to consumers £8 15s. per ton, in 5s. 6d. cwt. casks.

CALCIUM CHLORIDE.—British manufacturers' price, £5 5s. to £5 15s. per ton, according to quantity and point of delivery.

COPPERAS, GREEN.—At about £3 15s. per ton, f.o.r. or ex works.

FORMALDEHYDE, 40%.—Now quoted £28 per ton, ex store.

GLAUBER SALTS.—English material quoted £3 15s. per ton, ex station.

LEAD, RED.—Price now £30 per ton, delivered buyer's works.

LEAD, WHITE.—Quoted £40 per ton, carriage paid.

LEAD ACETATE.—White crystals quoted round about £42 to £44 per ton c.i.f. U.K. ports. Brown, on offer at about £1 per ton less.

MAGNESITE, GROUND CALCINED.—Quoted £9 per ton, ex store.

POTASSIUM BICHROMATE.—Quoted 5d. per lb., delivered U.K. or c.i.f. Irish ports, with an allowance for contracts.

POTASSIUM CARBONATE.—96% to 98%. In good demand. Spot material on offer, £28 per ton ex store.

POTASSIUM CHLORATE.—99½/100% Powder.—Quoted £34 per ton ex store.

POTASSIUM NITRATE.—Refined granulated quality quoted £28 per ton, c.i.f. U.K. ports. Spot material on offer at about £30 per ton ex store.

POTASSIUM PERMANGANATE B.P. CRYSTALS.—Quoted 8½d. per lb., ex store.

POTASSIUM PRUSSIAN (YELLOW).—Spot material quoted 8d. per lb., ex store.

SODA, CAUSTIC.—Powdered 98/99%, £17 10s. per ton in drums, £18 15s. in casks. Solid 76/77%, £14 10s. per ton in drums, £14 12s. 6d. per ton for 70/72% in drums; all carriage paid buyer's station, minimum four-ton lots; for contracts 10s. per ton less.

SODIUM BICARBONATE.—Refined recrystallised, £10 10s. per ton, ex quay or station.

SODIUM BICHROMATE.—Quoted 4d. per lb., delivered buyer's premises, with concession for contracts.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station; powdered or pea quality, 7s. 6d. per ton extra. Light soda ash, £7 per ton, ex quay, minimum four-ton lots, with various reductions for contracts.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £9 5s. per ton, ex station, minimum four-ton lots. Pea crystals on offer at £15 per ton, ex station, four-ton lots.

SODIUM PRUSSIAN.—Quoted 5d. to 5½d. per lb. ex store.

SODIUM SULPHATE (SALTCAKE).—Price, 65s. per ton, delivered, for ground quality.

SODIUM SULPHIDE.—Prices for home consumption: solid 60/62%, £10 5s. per ton; broken, 60/62%, £11 5s. per ton; crystals 30/32%, £8 2s. 6d. per ton, delivered buyer's works on contract, minimum four-ton lots. Spot material, solid, 5s. per ton extra; crystals, 2s. 6d. per ton extra.

SULPHUR.—Flowers, £12 10s. per ton; roll, £12 10s. per ton; rock, £9 per ton; ground American, £12 per ton, ex store.

ZINC CHLORIDE 98%.—British material now offered at round about £18 10s. per ton, f.o.b. U.K. ports.

ZINC SULPHATE.—Quoted £12 per ton.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

Visit of the Chemical Society to Glasgow

Final Arrangements

THE 91st annual general meeting, and the anniversary dinner of the chemical society will be held in Glasgow on Friday, March 18. This is the first official visit of the Society to Scotland. The Council hopes that the occasion will be marked by a large attendance and that, in particular, chemists and those associated with chemistry resident in Scotland and the North of England will make a special effort to be present. To ensure that all branches of chemistry and of chemical industry shall be represented at the meetings, the local sections of kindred societies and institutions and a number of industrial organisations have been invited and have agreed to co-operate. The arrangements are being undertaken by a general committee, of which Dr. W. M. Cumming is the honorary secretary.

The annual general meeting will be held in the Fore Hall of the University of Glasgow at 4 p.m., and will be followed at 4.30 p.m. by the presidential address on "The Publication of Chemical Literature," to be delivered by Professor G. G. Henderson, D.Sc., F.R.S. The anniversary dinner will take place the same evening at the Grosvenor Restaurant, Gordon Street (close to the Central Station), at 7 for 7.15 p.m. Applications for tickets (12s. 6d. each) should be made before Friday, March 11, addressed to Mr. S. E. Carr, The Chemical Society, Burlington House, Piccadilly, London, W.1.

The Lord Provost and the Corporation of the City of Glasgow will honour the Society by holding a Civic Reception in the City Chambers, Glasgow, on Thursday, March 17, at 8.15 p.m. Admission will be by invitation only, and those desiring to attend the Reception should apply to Dr. W. M. Cumming not later than Friday, March 11.

Through the kindness of Sir Harry McGowan, K.B.E. (president and chairman of Imperial Chemical Industries, Ltd.), an invitation has been received for Fellows to visit Nobel's Explosives Factory at Ardeer on Saturday, March 19. For those who wish to return home earlier in the afternoon of Saturday, a forenoon visit to the Provan Chemical Works, Provanmill, Glasgow, has been arranged by kind invitation of the By-Products Committee, through Mr. James MacLeod, F.I.C., manager of Glasgow Corporation Chemical Works.

Market for Ultramarine Blue in Chile

ULTRAMARINE blue is not manufactured in Chile and requirements are met by imports. Customs statistics do not classify the pigment separately including it along with Prussian blues. Imports of this group into the country during 1929 totalled 361,116 kilos, having a value of 658,636 Chilean pesos (Chilean peso = 80.121 United States currency). Belgium replaced United Kingdom as leading source of supply, furnishing about 42 per cent. and United Kingdom and Belgium following with 29 and 19 per cent. respectively. The share of the United States in the import trade is very small. Ultramarine blue is not imported in ball or liquid form but arrives in powdered or small lumps packed in round or square linen bags. Some quantity is also shipped, powdered in barrels containing 110 or 220 pounds.

Manchester Chemical Market

[FROM OUR OWN CORRESPONDENT.]

Manchester, February 10, 1932.

THE tariff proposals propounded last week-end have stirred up activity in the chemical market this week, principally in the direction of accelerating deliveries of Continental lines in time to escape the 10 per cent. duties. In most instances, of course, the materials had already been ordered by merchants and users, although there has been a noticeable tendency to enter into fresh commitments where there is a reasonable possibility of getting the goods cleared in time. The general demand on this market during the past week has been no more than moderate from the point of view of new bookings, and whilst the dyeing, bleaching, and finishing establishments continue to be fairly well employed there has been a falling off in the rate at which the cotton mills are able to secure business, and unless there is a marked improvement before long an important share of the consumption of chemicals locally will get back to its old dull level.

Heavy Chemicals

Moderate deliveries of prussiate of soda are reported, with prices firm on the basis of 5d. to 5½d. per lb. for crystals, according to quantity, with the powdered at ½d. per lb. additional. There is a quiet trade passing in the case of sulphide of sodium, current values of which are at £11 to £11 10s. per ton for the 60-62 per cent. concentrated solid quality and £8 10s. for the commercial crystals. Phosphate of soda is steady at between £13 and £13 10s. per ton for the dibasic material, but no big weight of fresh business has been placed on this centre during the past week. Caustic soda continues in fair request against contracts; values are at £12 15s. to £14 per ton, according to quality. There has been no change in the position of hyposulphite of soda, which is quoted at up to £15 10s. per ton for the photographic grade and from £9 to £9 10s. for the commercial. Bicarbonate of soda meets with a fair amount of inquiry and prices are firm at round £10 10s. per ton. Salt-cake is in quiet demand at the moment at about £3 2s. 6d. per ton. Bichromate of soda is steady on the basis of 4d. per lb., less 1 to 3½ per cent., in contracts, and the same figure bought net for spot parcels, with business on moderate lines. Alkali is in quietly steady demand and prices are maintained at £6 per ton. With regard to chlorate of soda a quiet trade has been reported this week at from £29 to £30 per ton.

Moderate buying interest has been shown in permanganate of potash, which is firm at about 8½d. per lb. for the B.P. quality and 8½d. for the commercial. Bichromate of potash is steady on the basis of 5d. per lb. in contracts up to the end of next month. Only a relatively quiet business has been done in chlorate of potash but at £34 to £35 per ton there has been little alteration in the price position of this material. Carbonate of potash has been quoted this week at up to £32 per ton, with caustic still in the neighbourhood of £38. Yellow prussiate of potash is in moderate request at about 8½d. per lb.

There has been no apparent expansion of buying interest in sulphate of copper, which is selling rather slowly at a top figure of £18 per ton, f.o.b. White powdered Cornish arsenic is in short supply and nominal at about £25 10s. per ton. There is only a quiet trade passing in the acetates of lime but prices are steady at from £12 to £12 10s. per ton for the grey quality and £8 for the brown. The demand for the lead compounds, also, is restricted, with nitrate on offer at about £29 per ton and white and brown acetates at £40 to £41 per ton and £39.

Acids and Tar Products

In the case of oxalic acid, a quietly steady business has been met with at sustained prices, these being at round £2 10s. per cwt., ex store. Acetic acid is firm and in fair request at £52 per ton for the technical glacial and £39 5s. for the 80 per cent. commercial grade. Citric acid is in quiet demand at from 1s. 1½d. to 1s. 2d. per lb., with tartaric acid in a somewhat similar position and quotably unchanged on the week at about 1s. 1½d. per lb.

Among the by-products, pitch is well held at up to £4 per ton, f.o.b., and available parcels are being readily taken up. Solvent naphtha is firm at 1s. 3½d. to 1s. 4d. per gallon, naked, although the demand this week has been rather inactive.

Sub-Crystalline Materials

Examination of Structure by X-Rays

A LECTURE on "The X-ray Examination of Sub-Crystalline Materials," was delivered before a joint meeting of the Manchester Section of the Society of Chemical Industry and the Manchester and District Section of the Institution of the Rubber Industry held at the Engineers' Club, Manchester, on February 5, Dr. T. Callan presiding. The lecturer was Mr. F. D. Miles, M.Sc., A.R.C.S., of Nobels, Ltd., Airdeer.

In opening his lecture Mr. Miles stated that the conception of a crystal as an arrangement of atoms at the points of a space lattice was familiar to everyone. No structure, however, was so simple that it could be represented by a single lattice; there were always a number which interpenetrated. The crystal of caesium chloride, which might be taken as one of the simplest possible cases, had the metal atoms at all the corners of a simple cubical lattice and the chlorine atoms at the corners of another so placed that each chlorine atom lay midway between the eight caesium atoms which surrounded it. In more complex crystals the number of interpenetrating lattices might be very large.

The "Glassy" State

Glasses had long been considered to be supercooled liquids without any trace of orderly arrangement, but that another view of them must be taken was shown by the very interesting work which Randall, Rooksley and Cooper of the General Electric Co., published in 1931. Those workers examined the band produced by a number of substances in the glassy state, including sodium and potassium borates, boric acid, calcium metasilicate (Wollastonite), glucose and sucrose. In all these cases they were able to show that the bands were exactly what might be expected from a crystalline powder of the substance from which the glass was made, if this powder could be examined in a state of division fine enough to broaden the bands to the width of those given by glasses. Vitreous silica probably consisted of minute crystallites of cristobalite 1.5×10^{-7} cm. in width. Borax glass must consist of minute crystals of sodium diborate of about the same size. In the latter case the deduction was unusually certain for no less than three bands in the glass corresponded to the strongest diffractions of sodium diborate.

Dealing with the X-ray examination of rubber, Mr. Miles stated that the suggestion that the rubber molecule was a long chain formed by the polymerisation of isoprene was made by Weber as far back as 1900. Rubber, however, was not fibrous and the X-ray diagrams of the raw unstretched material gave the single diffuse band characteristic of most liquids. Some years back Katz had the happy idea of examining it in the stretched condition, and found that when the extension had risen to 80 per cent. of the original length localisation of the diffractions began, and that when the stretching was at breaking point, a complete fibre diagram appeared.

Institution of the Rubber Industry

Annual Dinner of Scottish Section

THE first annual dinner of the Scottish Section of the Institution of the Rubber Industry was held in the George Hotel, Edinburgh, on Friday, February 5, Mr. A. Ryan presiding over a good attendance of rubber trade representatives, from Glasgow and Edinburgh. The company included Professor J. P. Kendall, F.R.S., Edinburgh; Professor F. J. Wilson, representing the Society of Chemical Industry, Glasgow; Dr. Young, Glasgow; Mr. Guy, Institute of Chemistry in Edinburgh; and Mr. A. Clark, secretary of the Scottish Section. Proposing the toast of "The Institution of the Rubber Industry," Professor Kendall referred to the benefits which chemistry had conferred on the industry. As an academic chemist he felt it was very important to the industry that intimate contact should be maintained between the commercial and research sides. His advice was that they should not restrict research on the improvement of materials to the times when the industry was flourishing. If they put their research men to work on problems when the production department was busy they were not going to get much progress, and if they did not make improvements somebody else was going to do so.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Mortgages and Charges

[NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.]

Satisfaction

ASTMOOR TANNING CO., LTD., Runcorn. (M.S., 13/2/32.) Satisfaction registered January 29, £10,000, part of amount registered July 21, 1928.

County Court Judgments

[NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.]

HY. HALLIFIELD OXLEY, The Old Cottage, Duffield, Derby, research chemist. (C.C., 13/2/32.) £10 11s. 7d. December 23.

F. COLIN SUTTON, 76 Greenfield Gardens, Cricklewood, chemical engineer. (C.C., 13/2/32.) £27 8s. 7d. December 14.

RICHD. ALURED DENNE, 1 Belvedere Terrace, New North Road, Huddersfield. (C.C., 13/2/32.) £11 4s. 7d. January 4.

London Gazette, &c.

Companies Winding Up Voluntarily

OLIVER UNITED FILTERS, LTD. (C.W.U.V., 13/2/32.) By special resolution, February 1. Mr. John Ross, 5 Victoria Street, London, S.W., appointed liquidator.

[This notice has been published to comply with the provisions of "The Companies Act, 1929," but the liquidation is the result of the amalgamation of the business of Oliver United Filters, Ltd., with that of The Dorr Co., Ltd., which latter company is taking steps to change its name to Dorr-Oliver Co., Ltd.—Ed. "C.A."]

SOLIDOL CHEMICAL (FRANCE), LTD. (C.W.U.V., 13/2/32.) By special resolution, February 2. Messrs. C. A. Cofman-Nicoresti and W. G. Burns appointed liquidators.

Winding-Up Petition

THE PARENT COAL CARBONISATION TRUST, LTD. (W.U.P., 13/2/32.) A petition for the winding-up of this company by the High Court of Justice was, on February 2, presented by Johnson and Phillips, Ltd., and is to be heard at the Royal Courts of Justice, Strand, London, on February 15.

Chemical Trade Inquiries

These inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country) except where otherwise stated.

INDIA.—The Director of Contracts, A.H.Q., Simla, invites tenders for 1,800 lb. best commercial mercury. Forms of tender (fee 5s., non-returnable) obtainable from the Director-General, India Store Department, Belvedere Road, Lambeth, London, S.E.1. Tenders must be sent direct to the Director of Contracts, A.H.Q., Simla, by registered post, to reach him not later than February 29.

BRITISH WEST INDIES.—A firm of manufacturers' agents at Kingston desires representation for the Island of Jamaica,

of United Kingdom manufacturers of insecticides, ingredients for making beer, etc. (Ref. No. 239.)

EGYPT.—The Egyptian Ministry of War and Marine is calling for tenders, to be presented in Egypt by March 8, for 70.945 metric tons of coconut oil. (Ref. No. B.7,264.) (This is a correction of a notice in the *Board of Trade Journal* of January 14, Ref. No. B.7,234, abstracted in THE CHEMICAL AGE of January 16, page 62, in which, owing to a clerical error in the Department, the quantity was given as 70,945 metric tons.)

EGYPT.—A firm of dealers in Cairo desires to establish connection with United Kingdom manufacturers of heavy chemicals, etc. (Ref. No. 290.)

EGYPT.—The Director of Stores, Department of Public Health, Cairo, is calling for tenders for paints, crude oil, etc., to be received up to April 2. (Ref. No. 25434/1932.)

ARGENTINA.—An agent in Buenos Aires desires representation of United Kingdom manufacturers of ultramarine blue and green paints and varnishes, etc. (Ref. No. 297.)

Company News

BROKEN HILL SOUTH, LTD.—A dividend at the rate of 1s. per share (5 per cent.) has been declared payable in Melbourne on April 15.

ELECTROLYTIC ZINC CO. OF AUSTRALASIA, LTD.—The directors have decided to pay the dividend, at the rate of 8 per cent. per annum, for the half-year to December 31, 1930, on the 8 per cent. cum. participating preference shares. The dividend will be paid on April 14. Payment of this dividend was postponed at this time last year. The last ordinary dividend was 10 per cent., in 1929-30.

BORAX CONSOLIDATED, LTD.—The latest report issued by this company states that there is a substantial increase in trading profits. At £238,113, they compare with £173,912, and despite a further reduction in interest received and the fact that £34,869 had to be provided for interest and sinking fund of the Tonopah and Tidewater Railroad Bonds, under the guarantee, the net figure comes out at £188,250, against £163,447. This is sufficient to meet debenture interest and preference dividend, to allow £30,000 to be set aside for depreciation, and to increase the carry-forward by £7,175 to £198,424. As previously announced, no dividend is to be paid on the preferred or deferred ordinary shares. The annual meeting will be held at Terminus Hotel, London, on February 15, at 12 noon.

Atlas Artificial Silk Processes, Ltd.

Scheme of Arrangement Sanctioned

In the Manchester Chancery Court on Tuesday, February 2, the Vice-Chancellor, Sir Courthope Wilson, K.C., had before him a petition in the matter of the Atlas Artificial Silk Processes, Ltd., Littleborough, presented by John Brandwood, Westbourne Road, Birkdale, the managing director, who is also a shareholder and a creditor.

Mr. J. Bennett, who appeared for Mr. Brandwood, said the company was incorporated in January, 1929, and had a capital of £1,000,000 in 4,000,000 shares of 5s. each, on which £497,296 had been paid up. Owing to financial difficulties the business had not been carried on since July 31, 1930. The Alliance Artificial Silk, Ltd., who held mortgages for £20,000 and £60,000, appointed a receiver on August 22, 1930, and on June 8, 1931, a winding-up order was made. The Official Receiver was the provisional liquidator. The great majority of the unsecured creditors thought the business could be carried on with good prospects of success if sufficient working capital was provided, and they had approved a scheme of arrangement. Under this scheme the unsecured creditors and the Alliance Artificial Silk, Ltd. (in respect of the £60,000), would accept 15s. in the pound, to be satisfied by the issue to them of debentures carrying 7 per cent. fixed interest. Debenture stock to the amount of £200,000 would be created. The present directors, except Mr. Brandwood and Mr. Feldmann, would retire, and Mr. Brandwood would cease to be managing director. In these circumstances the petitioner asked that the scheme be sanctioned, and further proceedings under the winding-up order stayed.

The Vice Chancellor sanctioned the scheme.

